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# Putting varieties of risk-based governance into institutional context
# The case of flood management regimes in Germany and England in the 1990s and 2000s.

Krieger, Kristian

*Awarding institution:*
King's College London

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# PUTTING VARIETIES OF RISK-BASED GOVERNANCE INTO INSTITUTIONAL CONTEXT: THE CASE OF FLOOD MANAGEMENT REGIMES IN GERMANY AND ENGLAND IN THE 1990s AND 2000s

**KRISTIAN KRIEGER**

A thesis submitted to the Department of Geography of King's College London for the degree of Doctor of Philosophy, London, September 2011

*For Sotiria and Nicólas*

## DECLARATION

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## ABSTRACT

This thesis analyses how floods are managed in two European countries, focusing in particular on the role of risk instruments within emerging flood management regimes. Studying flood management is not only relevant because of a rise in frequency and severity of flood events in the 1990s and 2000s, and the expectation of a further increase due to a changing climate. It is also a particularly suitable issue to enrich our understanding of how institutions shape risk-based governance.

Examining how institutions shape risk-based governance challenges and refines existing contributions on the rise of risk-based governance. In the literature, this rise is associated with arguments of the functional rationality of risk-based governance, in response to the particular problem of flooding, and to the wider need to deal with challenges to states as effective and legitimate problem-solvers. These arguments suggest a universal appeal and adoption of risk-based governance.

This assumption is challenged by undertaking a comparative analysis of the flood regimes of Germany and England in the 1990s and 2000s. Germany and England are compared because, actors in both countries have, following major flood events in the 1990s and 2000s, recognised the importance of risk instruments for their emerging, more anticipatory and adaptive approaches to flood management, and are seemingly subject to similar pressures on the state actors to become more effective and accountable. At the same time, they display substantive differences in their institutions.

In a first, descriptive step, using the risk regulation regime approach (Hood et al 2004), it will be demonstrated that risk instruments differ along three dimensions in the two countries' regimes. These dimensions concern varying types of information included in assessments (hazard versus risk), different treatment of the uncertainty implied in the concept of risk (safety

versus uncertainty), and the particular positions of risk instruments within the regime, in particular their centrality throughout the regime.

In a second, explanatory step, the variance between the two countries' flood regimes will be explained with regard to the specific institutional context in the two countries. This context shapes the choices of actors involved in flood management make concerning the design and role of risk instruments. It will be shown how most notably state traditions and perceptions, state structure, and the prevalent style of administration shape the risk-based flood regimes in Britain and Germany.

By putting risk-based governance into its institutional context, this thesis adds a note of caution to the debate of the rise of risk-based governance that points to the need to better understand the varied ways in and the conditions under which risk matters to modern governance.

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## ACRONYMS

ABI = Association of British Insurers

ARGEBAU = Interministerial Meeting for Urban Planning, Construction and Housing = *Konferenz der für Städtebau, Bau- und Wohnungswesen zuständigen Minister und Senatoren der Länder (Bauministerkonferenz)*

BAUGB = Baugesetzbuch = Federal Construction Code

BBK = Federal Office of Civil Protection and Disaster Assistance = *Bundesamt für Bevölkerungsschutz und Katastrophenhilfe*

BCR = Benefit-cost ratio

BfR = Federal Institute for Risk Assessment = *Bundesamt für Risikobewertung*

BMF = Federal Ministry of Finance = *Bundesfinanzministerium*

BMVBS = Federal Ministry for Traffic, Construction, Urban Development = *Bundesministerium für Verkehr, Bau und Stadtentwicklung*

BMU = Federal Ministry for the Environment and Nuclear Safety = *Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit*

DCLG = Department of Communities and Local Government

Defra = Department for Environment, Food and Rural Affairs

DEM = German Mark

DETR = Department of the Environment, Transport and the Regions

DKKV = German Committee for Disaster Reduction = *Deutsches Komitee Katastrophenvorsorge e.V.*

EA = Environment Agency

EUR = Euro

EXCIMAP = European Exchange Circle on Flood Mapping

FDGiA = Flood Defence Grant in Aid

GAK = Joint Federal Lander Task Agriculture and Coastal Protection = *Gemeinschaftsaufgabe Agrarstruktur und Küstenschutz*

GBP = Great Britain Pounds

GDV = Association of German Insurers = *Gesamtverband der deutschen Versicherungswirtschaft*

HLT = High-Level Target

HQ*n* = 1-in-*n* years statistical return period

HWSG = Federal Flood Control Act = Hochwasserschutzgesetz

ICE = Institute of Civil Engineers

IDB = Internal Drainage Board

LANUV = Agency for Nature, Environment and Consumer Protection = *Landesamt für Natur, Umwelt und Verbraucherschutz*

LAWA = Inter-Länder-Federal Working Group Water = *Länderarbeitsgemeinschaft* Wasser

LFUG = Environment Agency Saxony = *Landesamt für Umwelt und Geologie*

LPA = Local Planning Authorities

LTV = Saxony's State Reservoir Agency = *Landestalsperrenverwaltung*

MAF = Ministry of Agriculture and Forestry

MAFF = Ministry of Agriculture, Fisheries and Food

MKRO = Interministerial Conference for Spatial Planning = *Ministerkonferenz für Raumordnung*

MWME = Ministry of Economy, SMEs and Energy of NRW = *Ministerium für Wirtschaft, Mittelstand und Energie in NRW*

NAAR = National Assets At Risk

NaFRA = National Flood Risk Assessment

NAO = National Audit Office

NFCDD = National Flood and Coastal Defence Database

NGO = non-government organisation

NPM = New Public Management

NRA = National River Agency

NRW = North Rhine-Westphalia = *Nordrhein-Westphalen*

OM = Outcome Measures

PPG = Planning Policy Guidance note

PPS = Planning Policy Statement

RFAP = Rhine Flood Action Plan = *Aktionsplan Hochwasser Rhein*

RFDC = Regional Flood Defence Committee

ROG = Federal Spatial Planning Act = Raumordnungsgesetz

RSU = Advisory Council for the Environment = *Rat der Umweltsachverständigen*

SAX = Saxony = *Sachsen*

SMUL = Saxonian Ministry for Environment and Rural Affairs = *Staatsministerium für Umwelt and Landwirtschaft*

SOP = Statement of Principles

ST = Sequential Test

TCPA = Town and Planning Act

USD = U.S. Dollar

USGs = ‚inundation areas' = *Überschwemmungsgebiete*

WHG = Federal Water Management Act = Wasserhaushaltsgesetz

ZÜRS = Zoning System for Flooding and Extreme Rainfall = *Zonierungssystem für Überschwemmung, Rückstau und Starkregen*

## ACKNOWLEDGEMENTS

In the course of writing this dissertation, I was fortunate to benefit from the material, intellectual and moral support of several people and institutions.

The UK Economic and Social Research Council (grant number: RES-062-23-0913) generously funded three years of my studies.

I am most grateful to Henry Rothstein and David Demeritt, who saw me through this project. Henry patiently helped me becoming acquainted to the field of risk and regulation while David guided me through the fascinating world(s) of human geography in general and flood management in particular. Both offered reassurances and fresh ideas (even though these ideas sometimes reflected their different backgrounds) when I was unsure about where to take this study next. I am also thankful for their flexibility in arranging meetings since I often only came to London for the day. David was also instrumental in obtaining funding for three years from the ESRC.

This research would not have been possible without the willingness of the experts and policy-makers in Germany and England to patiently answer my sometimes naïve questions about the often technical issues involved in flood management. My field work in Germany was also made much easier by the fact that the Environmental Policy Research Centre at the Free University Berlin hosted me as a visiting researcher for several months in 2008 and 2009. I am in particular indebted to Klaus Jacob for his support.

I have greatly benefited from working alongside colleagues at King's and beyond many of them have over the years become close friends. In particular, I would like to thank Kati Orru and Ala Pigree for taking time to discuss ideas, chapters and sharing moments of despair and inspiration. I sought and found advice from the wise post-docs Sebastien Nobert, Naonori Kodate, John Downer and Fabrizio Cantelli who were also more than willing to offer opportunities for procrastination. A very special thanks goes to Brooke Rogers who helped me in so many ways that listing them would delay submission indefinitely.

Moreover, I owe my gratitude to my colleagues James Porter, Roger Miles, Jacopo Torriti, Frederic Bouder, Jenni O'Connor, Jamie Wardmann, Tim Harries and Ben Sheppard for many constructive discussions at seminars and beyond. I am also thankful to Ragnar Lofstedt and Andreas Klinke for facilitating my return to academia and discussing early ideas of my dissertation.

I would also like to thank my parents, Jutta and Werner, who have always supported, if not strongly encouraged, me to take my studies a step further. Perhaps most importantly, a special thanks to my mother for coming over to look after her grandson when both my wife and I were working! *Vielen, vielen Dank für Eure Hilfe.*

Last but not least, I don't know how to thank my beloved Sotiria for being there. I could not have wished for a better companion. From her own experiences, she knew exactly about the difficulties of writing a dissertation and how to deal with them. But most importantly, I am forever grateful that I could draw on Sotiria's infinite capacity for loving support and sympathy. Σ'αγαπώ, παπίτσα.

Finally, I am grateful to my son Nicólas. Not only did he tolerate his father's absent-mindedness in these first six months of his life but he learned to smile and laugh very quickly to cheer his father up even in the darker hours of writing-up.

To Sotiria and Nicólas, I dedicate this thesis.

London and Brussels, September 2011

# CHAPTER 1: INTRODUCTION. EXPLORING THE DIVERSITY OF RISK-BASED FLOOD MANAGEMENT

**Figure 1: Tewkesbury Cathedral, England, Summer 2007**

In the summer of 2007 large parts of England were covered with water following unprecedented precipitation in the months of June and July. Thirteen people died in the floods. About 48,000 households were flooded and billions of pounds of damage was caused. Among the households damaged were those of Tewkesbury in West England as the picture above shows.

As the only building spared from the water appears to be the cathedral the picture ironically underlines the traditional description of floods as 'Acts of God' – normally understood as events outside human control that cannot be reasonably foreseen or prevented and for which therefore no one can be held responsible. The miraculously spared cathedral notwithstanding, the description of floods as being unforeseeable, out-of-control events is difficult to reconcile with the developments in modern flood management over the 20$^{th}$ century. In fact, a look at England's Environment Agency's flood map (see figure 2) demonstrates that the divine intervention in favour of the Cathedral at least did not come as a surprise.

The Cathedral (at the tip of the red error) is only likely to be flooded in the event of an extreme flood event (the bright-blue colouring indicates a probability of once every 1,000 years); the July 2007 floods affecting Tewkesbury only had a statistical return period of about once every 200 years.

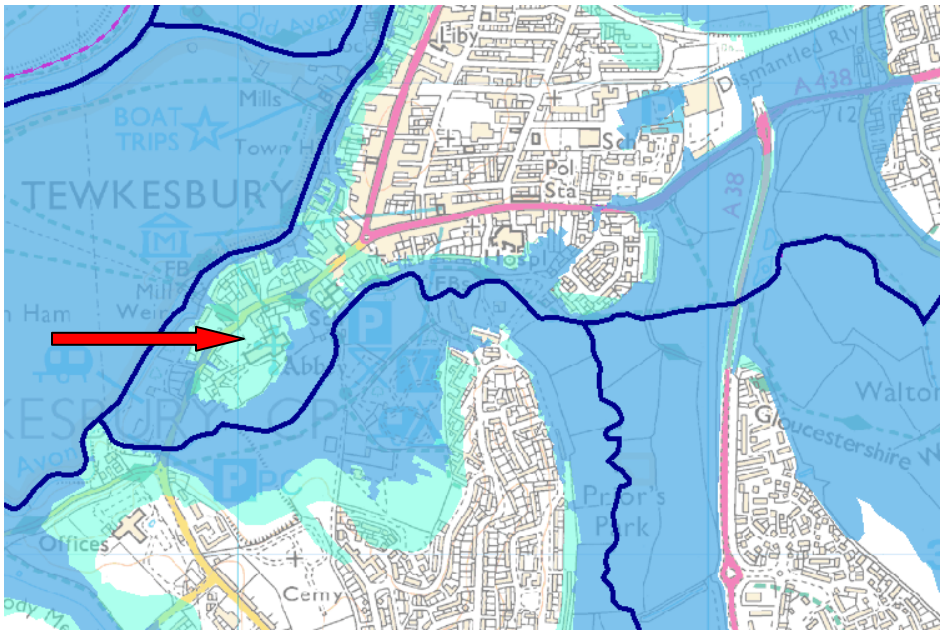


**Figure 2: Tewkesbury Cathedral on the Environment Agency's EFO flood map**

But modern science improves flood management in other ways, too: for instance, through flood forecasting systems (such as the one for the Rhine river that provides downstream communities with up to 48 hours of notice) or through constructing flood defences (the German population is protected by about 7,500 km of dykes and embankments) in order to confine floodwater to its 'natural' place and thereby prevent the inundation of homes. While such measures have clearly not always been sufficient to provide absolute protection the ability to foresee and manage floods and their consequences has risen significantly.

This is a result of the increasing availability of advanced instruments for flood risk assessment and risk-based flood management. Generally such instruments undertake and manage flooding on the basis of calculations of the probability and consequences of harmful events. More precisely

instruments such as flood maps, catastrophe models, and probabilistic flood flow models describe the probability of the occurrence of certain water quantities and their consequences, for instance, in terms of the water's distribution over land and its effects on values. Such calculations may enable actors involved in flood management to design infrastructure to protect people and values from future flood disasters, to move or keep them out of future harm's way and to improve the ability to recover from disasters in the future. In general the rationale for using risk in flood management is to anticipate flooding and take preparatory and adaptive measures. Risk calculations may therefore form the basis for a broad range of risk-based flood management measures and the organisation of flood management regimes.

As shown by the choice of examples above, Germany and England[1] are two countries in which actors make use of flood maps, forecasting and the preventive infrastructure of flooding to discharge of their flood management responsibilities. In other words, flood management in both countries seems to be strongly risk-based.

The research presented here examines in detail the role of the concept and instruments of risk within the flood management regimes[2] in Germany and England. Its central aim concerns the systematic analysis and explanation of varying roles of risk[3] within flood management regimes

[1] This thesis focuses on the flood management regime of England. Since devolution in 1999, Scotland and Northern Ireland have increasingly differentiated regimes of their own. This concentration on England where the central government in Whitehall plays an increasingly important role for flood management, however, makes sense, as will be argued later (chapter 4) in the light of the institutionalist perspective chosen for this study.

[2] The regime concept will be discussed more extensively in chapter 4 on the research design. At this stage it is sufficient to remark that – drawing on the concept of risk regulation regimes by Hood et al. 2004 – flood regimes are formal and informal mechanisms including the organisational architecture, sets of rules and ideas and practices that aim to reduce flood risks.

[3] Risk is conventionally defined as a probability of adverse consequences. However, as this dissertation will show, risk can be conceptualised and used in different ways in flood management. Chapter 3 in particular will elaborate on the use of the concept of risk in governance while chapter 8 will highlight the diversity in the conceptualisation of risk in the flood management of Germany and England. At this stage, it is sufficient to note that the concept of risk is used to introduce a probabilistic and quantitative logic into governance

embedded in different institutional contexts. This study therefore constitutes an effort to learn more about different forms of risk-based governance[4] and their compatibility with different institutional settings.

The rest of the chapter briefly outlines some of the central arguments in the debate about risk-based governance, introduces the research questions, discusses the main themes of the study, and sketches out the reasons for comparing Germany and England before presenting the structure of the dissertation.

### 1.1 CONVERGENCE OR DIVERSITY IN RISK-BASED FLOOD MANAGEMENT?

Why focus on *diversity* in risk-based flood management, though? There are good reasons to assume the opposite, namely a *convergence* towards particular forms of risk-based flood management. Convergence towards risk-based flood management can be argued to be functionally rational, as well as underpinned by various institutional mechanisms. Moreover, particular forms of risk-based governance are often said to be on the rise because they help enhance the problem-solving capacities of the Western liberal democratic state. These capacities in turn have been contested from different angles in policy and scholarly debates, most notable questioning the economics of state involvement and exploring the repercussions of heightened demands for accountability and scrutiny of state operations in risk governance.

More specifically the concept and instruments of risk can, first, be argued to be functionally rational for the emerging flood management

(quantitatively assessing the probability of occurrence of a potentially harmful event) that might or might not be complemented with a monetary logic (calculating the probable economic damage).

[4] Broadly speaking governance is about the exercise of control. Governance is normally juxtaposed to government and hierarchical state interventions as it includes a variety of hierarchical and non-hierarchical measures undertaken by state and non-state organisations (Mayntz 2001; Hood et al. 2004; Rhodes 1996; Rosenau and Czempiel 1992). The concept of governance is primarily used in this study to highlight the openness of this analysis towards the contributions of non-state actors to exercising control, in particular the insurance industry. The specific term of risk-based governance will be elaborated in chapter 3. In general risk-based governance means that governance interventions and resources are informed and shaped by calculations of risk. It is, however, important to note that this study shows that there is not a single form of risk-based governance.

regimes, which emphasise anticipatory and adaptive interventions over remedial measures. A second argument suggests that the widespread adoption of similar risk-based flood management approaches results from the transnational diffusion of particular risk-based flood management approaches through transnational expert co-operation and international flood policy integration, echoing neo-institutionalist arguments about isomorphism (DiMaggio and Powell 1983). These arguments, reflecting a widely adopted paradigm shift in flood management and the particular transnational institutional mechanisms for flood policy diffusion, are specific to the issue area of flood management.

Beyond these flood-specific arguments there are other arguments that present the concept and instruments of risk more generally as means to address a set of challenges to states as effective and legitimate problem-solvers. In particular, these challenges concern: the economic performance of public spending and the adverse consequences of government regulation of a country's economy and society; advocacy for the market as a superior regulatory and distributional mechanism to states; and the increased public scrutiny of state operations and resulting accountability pressures on state actors. The 'economic effectiveness' arguments are normally associated with neoliberal ideas ((Peck 2001; Peck and Tickell 2002; Castree 2008a; Castree 2008b) while the 'accountability' arguments (Power 2004; Black 2005; Rothstein et al. 2006a) have emerged more recently in response to the rise of the debates and policy initiatives about 'good governance' (for instance, the 2001 'European Governance' White Paper by the European Commission (EC 2001)). These two (sets of) arguments are embedded in the observations that the economic and accountability pressures apply internationally to developed liberal democracies as a consequence of phenomena such as economic globalisation, the spread of new information and communication technologies and wider shifts in society towards 'late modernity' (Giddens 1991). Given the assumed universality (in relation to developed liberal

democracies) of these pressures a convergence towards particular forms of risk-based governance can be expected.

But how can such arguments about the convergence of risk-based flood management be squared with the stark contrasts found between emerging flood management regimes in Germany and England? For instance, why does England's central government strongly rely on a risk-based benefit-cost ratio to allocate its flood defence budget while Germany's Federal government allocates most of its spending on flood management in accordance to the *Königsberger Schlüssel* (an allocation key proportional to the population numbers of the 16 Länder)? Why does Germany's government very restrictively and almost exclusively regulate new property developments in areas that are inundated on average once every 100 years while England's national policies cover areas exposed to flood events as rarely as once every 1,000 years with more flexible restrictions based on three different risk zones? Finally, why does the German state spend GBP 4.1 billion (of the GBP 7.5 billion in total economic losses) for remedial actions in the aftermath of the Elbe 2002 floods while the economic losses of about GBP 2 billion from the 2007 floods in England were largely covered by the insurance industry (GBP 1.5 billion) – even though both countries' governments officially subscribe to private flood insurance schemes?

These questions point to a diversity in risk-based flood management that seems rather puzzling in view of the arguments in support of international convergence in flood management regimes.

### 1.2 RESEARCH QUESTIONS AND THEMES

Risk has arguably become increasingly central within flood management regimes across Europe. Probably the most visible expression of this rise is the agreement and adoption of the Floods Directive in 2007 (EC 2007) by the member states of the European Union in which flood risk assessment and risk management are identified as key prerequisites to preventing major flood disasters. Yet, as this dissertation shows, convergence arguments fail

to account for the impact of the different institutional contexts on policy instrument choices by actors involved in flood management. More specifically, different forms of risk-based governance are more compatible with some institutional settings and the particular actor interests, constellations and interactions that follow from them than other institutional contexts.

Drawing on a set of 48 semi-structured expert interviews, a review of scholarly literature on risk and governance and a close analysis of policy documents this study seeks to answer the following research questions:

- First, what arguments can be made in support of the rise of and convergence towards a particular form of risk-based flood management? To what extent does the practice of flood management in Germany and England match the expected form of risk-based flood management?
- Second, what different forms of (and to what different degrees) are risk instruments and conceptualisations adopted in and shaping the flood management regimes of Germany and England?
- Third, which and how do different institutional variables shape this variance in the risk-based governance of flooding? Can the institutionally shaped regimes be understood as particular and consistent national 'styles' of risk-based governance?

These questions revolve around five interrelated themes that resonate with the wider scholarly debates on risk in governance. The first theme is the convergence theme. This theme has been salient since the concept of risk was popularised in the social sciences through Ulrich Beck. Beck's risk society (1992; 1999) is mostly associated with the emergence of potentially catastrophic risks that are linked to human activity and technology in 'advanced modernity'. In response to this transition to 'advanced modernity' and the rise of associated risks, science and technical risk analysis universally become increasingly essential for risk governance. This thesis focuses on the four different convergence arguments (that were introduced in

the previous section), reflecting the aim of adopting a more nuanced view of how science-based and technical risk analysis is actually used in flood management regimes. As this dissertation will show, the four arguments are relevant for a study of flood management regimes because of recent shifts in international flood policies, the economic costs and consequences of flooding and flood management, and the potential implications of disasters on the state's legitimacy. However, they fail to explain how and why the emerging risk-based flood management regimes in Germany and England make use of the concept and instruments of risk in very *different* ways.

The second theme is therefore concerned with the diversity in the use of risk in governance. Diversity in the choice of policy instruments from country to country is a familiar topic of research. For instance, scholars (for instance, Vogel 2003) have discussed the varying roles and interpretations of the precautionary principle in different countries. Another example is the variation in the definition of acceptable risk and the value of each life between and within countries (Viscusi 1993; Heimann 1997). Moreover, researchers have also taken note of the fact that risks (for instance, road worthiness of cars) are sometimes not at all regulated in one country (France) but subject to tight regulations in another (Germany) (Hood et al. 2004). The discussion of diversity in flood regimes, first, focuses on 'qualitative' differences in the use of risk in governance, namely different conceptualisations of flood risk. One question that will be identified as important in the context of flood management is whether calculations of the probable (material) damage matter for governance interventions or not (instead, the focus is simply on the probable inundation). This question therefore revolves around the differences between the concepts of risk and hazard. Another question that emerges in the context of flood management is whether risk is used to pursue safety or communicate uncertainty. This question is therefore concerned with the links between the concepts of risk, safety and uncertainty. Secondly, a more 'quantitative' aspect of this study asks about the centrality of risk as an organising principle for governance

interventions and organisation, and where it is marginalised by alternative rationalities, such as political proportionality. As the discussions in the following study demonstrate, these differences in the use of risk in governance challenge arguments that expect the rise of one particular form of risk-based governance. But in what patterns can this diversity be found in the two countries' regimes?

The third theme revolves around national patterns in risk-based governance. This theme of national patterns echoes arguments found in scholarly literature closely related to risk-based governance. The politics of regulation literature, for instance, contrasts the informal style of regulation found in Europe with the formalised regulations of the United States (Vogel 1986). National patterns have also been found for the so-called 'civic epistemologies' (through which the public assesses the robustness of techno-scientific claims that inform collective decision-making), distinguishing Germany's consensus-seeking (built through negotiations of institutional stakeholders) from Britain's communitarian epistemologies (based on shared perceptions among those involved in the issue area's specific policy community) (Jasanoff 2005). The discussion of national patterns in flood management regimes of Germany and England follows the previous theme of diversity. Are there unique national approaches as to how much safety the state provides in Germany and England? Can national patterns be discerned as to the extent that the uncertainty of protection is considered and communicated in the two countries? How important an organising principle is risk in the respective flood regimes, and are there distinctive alternative logics in each of the two countries that have marginalised risk in flood management? Are calculations of damage potential important in one but not the other country? As this study of flood management regimes in Germany and England will illustrate, it is possible to discern distinctive patterns of use (and marginalisation) of risk in the two countries.

The fourth theme embeds these national patterns in their respective macro-institutional context. More specifically, such an institutionalist

perspective, widely used for cross-country comparisons of governance (among others, the aforementioned analyses of the politics of regulation and civic epistemologies use this perspective), takes into account structural, cultural, normative and procedural macro-institutional factors that shape ideas, interests and interactions of key actors when they decide upon the use of risk in governance. Three sets of macro-institutional variables emerge as particularly relevant throughout this study of the flood regimes, namely the fragmentation and coherence in government and public administration, along with the perceptions and norms that reflect and describe the state's objectives, as well as particular styles of public administration. More specifically, how do Germany's Federal structure and England's centralised state shape risk-based flood management? How do (constitutional) norms about the well-being of citizens in Germany and England's adoption of neoliberal convictions influence the shape of risk-based flood management? How compatible are Germany's legalistic and England's managerial style of public administration with risk-based flood management? As will be shown in the course of this dissertation, these variables are important determinants of the national patterns found in the flood regimes of Germany and England.

The final theme is concerned with additional explanatory factors beyond the macro-institutionalist context. Looking beyond macro-institutional context is necessary because of the contradictions found within the two regimes in spite of the effects of the prevalent macro-institutional factors. Why, for instance, are the boundaries of the German state's provision of safety fuzzier than the probabilistically defined standards suggest? Why do partially inefficient private insurance markets underpin the economic efficiency logic of England's public flood management regime? These contradictions point to a number of factors familiar to scholars of risk governance and policy change. One factor is the importance of post-disaster politics and pressures on the state. Scholars have discussed disasters as 'focusing events' (Birkland 1998) and 'catalysts' for policy change (Johnson et al. 2005). Another factor is the legacy of historical institutional

settlements on current actions by regime actors, reflecting arguments of 'path dependency' made by historical institutionalists (Pierson and Skocpol 1999; Thelen 1999; Mahoney 2000).

By discussing these themes this research seeks to contribute to two, heretofore largely separate, areas of research. First, this study contributes to the specific debate in geography and environmental studies about the management of flooding. It does so by undertaking a comparative analysis of two countries' flood regimes and by focusing on the variations in particular concepts of governance and types of policy instruments in different contexts. This is particularly important as policy convergence around risk-based forms of flood management is not solely driven by expert collaboration and consensus but also by supranational regulations such as the EU Directive on the assessment and management of flood risks from 2007 (EC 2007). Understanding what forms risk-based regimes take in different countries is therefore relevant with respect to fulfilling international obligations and learning about the relative adaptive capacities and paths in different institutional settings to challenges such as flooding.

Secondly, this research contributes to broader debates in political science and sociology about the rise of risk-based governance. By putting risk-based governance systematically into different institutional contexts, it enriches contributions that study the emergence of risk-based governance in a single country (e.g. Power 2004); those that take a macroscopic perspective, implying a universal trend towards a greater role of risk in governance (e.g. Beck 1999); and those that focus on developing theoretical arguments (e.g. Rothstein, Huber and Gaskell 2006a) on the rise of risk-based governance without embedding these arguments systematically in a comparative empirical context.

### 1.3 WHY FLOOD REGIMES OF GERMANY AND ENGLAND?

This dissertation aims to enrich our understanding of the nature and drivers of diversity in risk-based governance and in so doing to challenge arguments

that assume the rise of similar forms of risk-based governance internationally in response to particular 'universal' pressures for convergence. To this end, the country cases selected for comparison should on the one hand be subject to the pressures for convergence (as well as be familiar and capable of adopting advanced instruments for risk assessment and risk-based management). On the other hand, they should also vary along the explanatory variable. In other words, reflecting this research's institutionalist perspective, the actors in charge of flood management should be embedded in strongly varying institutional contexts.

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Germany and England meet these requirements: both have suffered recently from devastating flood events that triggered policy change (and made resources available to flood management) towards risk-based anticipation and adaptation; actors in both countries are involved in similar international expert and policy-making circles that promote risk-based flood management; both countries' state actors have been subject to economic efficiency and accountability pressures. At the same time, however, scholars have described their institutions as fundamentally different, whether in terms of electoral systems (Lijphart 1984), state structure (Schmidt 2005), political economy (Hall and Soskice 2001) or administrative culture and structure (Knill 1999; Hood and Lodge 2004). This renders Germany and England interesting cases to study how institutions filter and shape the choices of risk instruments by actors in each of the two countries.

The risk regulation regime approach (Hood et al. 2004) offers a useful analytical framework for a comparative study because it creates a

comprehensive and nuanced representation of the mechanisms of control through which actors manage flood risk. First of all, the regime approach operates at the meso-level, and establishes relatively clearly delineated analytical objects (the risk-based flood management regimes). This is a departure of macro-level accounts such as the one of a global risk society (Beck 1999) that potentially overlook important differences in the responses to risks. Secondly, the usefulness of the regime approach is a result of the disaggregation of risk regulation regimes into regime functions (and, in this dissertation, policy domains). This reveals inconsistencies and contradictions within the regimes that would go unnoticed if the analysis was focused on only one function (such as standard-setting) or one domain (for instance disaster financing). It allows for a refined detection of diversity in risk instruments, function-by-function and domain-by-domain. Finally, the regime approach is open to non-state and informal mechanisms for the exercise of control. This is particularly relevant for flood risk regulation where the private risk managers of the insurance industry play a crucial role and the co-ordination between an increasing range of actors relies on informal agreements and rules. This risk regulation regime approach therefore provides the analytical tools to comprehensively represent the diversity in risk-based flood management.

### 1.4 STRUCTURE OF THE THESIS

The thesis's structure can broadly be split into three parts. The first part is introductory and consists of chapters 1–4. Following this brief introductory chapter 1, chapter 2 describes the issue area of flooding and its management, as well as elaborating on the rationale for choosing it as an ideal area for undertaking a comparative study on risk-based governance. Most importantly, the chapter highlights the central role that risk instruments have been assigned to in emerging flood management regimes. Chapter 3 provides a broad overview of the literature on the rise of risk in governance, noting how this literature has yet to develop a systematic comparative perspective. Moreover, the chapter sets out how such a comparative view

could benefit from institutionalist approaches. Chapter 4 introduces the research design. In particular it elaborates on the risk regulation regime approach that allows for a tailored testing of convergence arguments and systematic comparison of risk-based flood management and explains the selection of country cases.

The second part comprises the three empirical chapters 5–7, each of which also challenges one line of argument in favour of international convergence in risk-based flood management. More specifically in chapter 5 the regime domain of flood defence management offers a favourable testing ground for arguments that risk serves the 'roll-back' and economic evaluation of state operations. In chapter 6 the regime domain of land-use regulation is examined from a 'regulatory state' perspective since risk can help manage the trade-off between a precautionary stance on the regulation of areas of flood risk with interests in the economic utilisation of these areas. In chapter 7 the regime domain of disaster financing serves as a testing ground for arguments about insurance markets as a governance mechanism superior to the state.

The third part is summative and contains chapters 8 and 9, which brings together the findings of the partial analyses of chapters 5–7. Chapter 8 takes a holistic view on the flood regimes. The chapter first challenges functional and institutionalist arguments in support of the international convergence in risk-based flood management. Second, it consolidates the partial analyses of chapter 5-7 into a holistic description of the distinctively patterned national flood regimes and their institutional and other determinants. Chapter 9 is the concluding chapter, in which the implications of this study beyond the concrete case of flood management and for future research into risk-based governance are drawn.

## CHAPTER 2: UNDERSTANDING FLOODING AND RISK IN FLOOD MANAGEMENT

Floods are major policy challenges. One reason is the fact that they wreak havoc on large stretches of land. The English floods in the summer of 2007 mentioned in the first chapter affecting Tewkesbury (as well as a large number of other cities and villages in England) were only the most recent. They followed other major flood disasters in England – in particular the Easter 1998 and the autumn 2000 floods. And England was not alone in its suffering. An even more damaging catastrophe than England's 2007 flood took place in central Europe in August 2002, with parts of Germany, Austria, Poland and the Czech Republic – as riparian countries to the Elbe river – being devastated.

Another reason why flooding constitutes a particular policy challenge is the complexity of the emerging responses to flooding – mostly reflecting the growing recognition that flooding is not a purely nature-made disaster. Rather, the negative effects of interventions into the natural river channels and the economic utilisation of rivers and floodplains point to the human factor involved in turning floods from being part of the natural water cycle into disasters. The interventions of the emerging approaches to flood management target both natural and socio-economic processes, thus involving a wider range of actors and policy areas and thereby increasing the complexity of flood management.

In this context of potential devastation and complex governance it is possible to observe that the concept and instruments of risk have become increasingly central within flood management regimes. But how can risk help in dealing with major policy challenges such as flooding and organising complex governance arrangements in response to flooding? Is there room for diversity in the emerging risk-based flood management? This chapter therefore explores why flood management is a suitable issue area to examine the issue of diversity in risk-based management.

The chapter starts with a discussion of the recent rise in the number of devastating flood events that catapulted flooding to the top of the political agenda in the early 2000s in particular. Second, it describes the emerging patterns in the policy responses to flooding in many European countries. Third, it takes a closer look at how these policy responses in particular and flood management in general include a special role for the concept and instruments of risk in flood management. The chapter concludes with a brief discussion on why flooding and the emerging *risk-based* flood management promises to offer interesting insights into diversity in risk-based governance.

## 2.1 THE CHALLENGE OF FLOODING: MULTIPLE DISASTERS IN THE 1990S AND 2000S

Flooding is, most simply put, about too much water in the wrong places. More formally, flooding can be defined as:

> "temporary covering of land by water as a result of surface waters escaping from the normal confines or as a result of heavy precipitation" (Kron 2003:2).

The history of European societies is full of tragic flood disasters. To name a few early ones: a storm surge in East Anglia in 1099 caused an estimated 100,000 deaths. In 1530 flooding from rivers and the sea killed approximately 400,000 people in the Netherlands (Mitchell 2003). Disasters in these medieval times as Quarantelli (2001) argues were attributed to the supernatural and defined as 'Acts of God'. This implied that while too much water clearly went to the wrong places there was little that could be done about it.

This fatalistic attitude was – says Quarantelli – replaced by a perception of disasters as 'Acts of Nature', a shift in attitude that occurred with scientific progress and secularisation during Europe's Enlightenment. This shift was associated with increasing human endeavours (driven by progress in science and technology) to control the natural process of flooding – primarily in order to utilise floodplains for economic purposes

such as agriculture and industrial development. Historical examples of control through engineering include the large-scale river straightening and training of Germany's Odra between 1736 and 1788 and of the Rhine between 1817 and 1876. From being a problem *beyond human control*, flooding turned into an issue that was perceived as being largely *under technological control.*

Floods – in particular river and other forms of inland flooding[5] – gained salience as a policy challenge recently because the *limitations of technological control* became increasingly apparent in the last two decades. These limitations were seen in recent experiences with flood disasters in Europe: European societies have seen a steep rise in the frequency and damage resulting from flooding in the 1990s and 2000s. Barredo (2007) counted as many as 168 flood events for the EU-27 between 1990 and 2005 compared to only 72 events between 1950 and 1989. Making a distinction between major floods[6] from the total number of floods Barredo notes that 24 out of a total of 47 major disasters since 1950 occurred in the 15 years between 1990 and 2005. Most of the major flood events that occurred between 1990 and 2005 were either river or flash floods whilst the most recent severe storm surges occurred in 1953 (East Coast flooding in Britain; Netherlands and Belgium) and 1962 (Germany, in particular Hamburg).

Moreover these statistics hide important singular events and their characteristics. One example are the Rhine floods in 1993, during which the defences protecting Cologne's old city centre failed, resulting in major damage to buildings and property in the city (as the image below illustrates).

[5] Flooding is normally classified into three different categories namely river floods, flash floods and storm surges (Perry 2000; Berz et al. 2001; Kron 2005). While river floods concern events that overwhelm the capacity of the river channel flash floods are local events that result from intense rainfall over a small area within a short period of time and storm surges/tidal flooding refer to events in which water from the sea is pushed onto dry land by storms or onshore winds. Inland flooding normally refers to all forms of flooding including flash floods with the exception of tidal/coastal flooding. Inland floods in particular riverine flooding are at the heart of this thesis' attention because it is the type of flooding that has caused the greatest damage in recent years and is the field of management where the greatest changes took place.

[6] 'Major' floods are defined as those where the number of casualties is greater than 70 and/or the direct damage is larger than 0.005% of the EU GDP in the year of the disaster.

**Figure 3: City centre of Cologne, winter 1993, Germany**

Important defences also threatened to fail in the event of the 1995 Rhine floods and during the 1997 Odra floods which led in the former case to a mass evacuation of the population and livestock in the Netherlands and in the latter case to the deployment of the German army to stabilise the dykes with thousands of sandbags. These incidents underlined the *precariousness of technological control* over the forces of nature.

In addition the statistics also hide the *unprecedented scale of some of the recent disasters*[7]. For instance floods in autumn 2000 affecting large areas of England and Wales caused immense economic damage, exceeding the threshold of GBP one billion for the first time for Britain. This sum however pales in comparison to the economic losses incurred in Germany during the August 2002 floods along the Elbe, which resulted in about EUR ten billion damages – or those of the summer 2007 floods in England and Wales with an estimated GBP two billion economic losses.

There are multiple causes for this rise in the frequency and damage from the (mostly riverine) flood disasters in the 1990s and 2000s. River

[7] Further figures on economic damages of flood events can be found in chapter 7 on disaster financing.

flooding is on the one hand part of the natural water cycle. It occurs if water resulting from for example precipitation or snowmelt exceeds the capacities of a specific water body such as a river channel. Some authors have therefore argued that flooding has and will become an ever greater threat to society as a result of changing precipitation patterns and snowmelt induced by global warming (Bronstert 2003; EC 2008). Others point to human activities such as the sealing of soil surfaces, the conversion of meadowland into arable land and the construction of dykes and roads. Such activities interfere with the natural water storage properties of vegetation, ground and soil, leading to a greater quantity of water that flows through river channels or accumulates in low-lying areas (LAWA 1995). On the other hand flooding only becomes a disaster if the water affects assets and processes valued by society. It has been argued that the rising economic damage caused by flooding is a result of factors such as an increase in affluence, a more flood-vulnerable evolution of economic structures and activities, changing land-use and urbanisation (Mitchell 2003).

Regardless of the exact contribution of each of these factors to recent flood disasters, the greater frequency and damage from flooding (as well as the recognition that flooding is *beyond (technological) control*) has led to a review of approaches to flood management. In particular this concerns riverine floods in many individual European countries as well as at the pan-European level. The emerging approaches will be discussed in the next section.

## 2.2 CHANGES TO MANAGING FLOODING: FROM CONTROLLING TO ADAPTING TO FLOOD DISASTERS

Given the devastation resulting from flooding there is a strong demand for its effective management. Flood management – for example through building local weirs and embankments – was historically organised locally by individual riparian property owners or local private collective actors such as England's Internal Drainage Boards or the *Deichverbände* (dyke associations) along parts of the Rhine river. However as water bodies and

floodplains became economically more important and the potential damage from flooding more extensive the state assumed an ever-greater role in protecting the population from the consequences of flooding.

The aforementioned river straightening of the Rhine and the Odra in the 19th and 18th century respectively are historical examples for the major role the state assumed in flood management. The two examples also reflect the approach to flood management that prevailed in advanced industrialised European countries until the 1990s, namely a reliance on engineered interventions into natural processes. The image of the 7.5 km long Rhine dyke in Neuwied (constructed in the 1930s) that protects Neuwied (including the 500-metre flood wall pictured below) is instructive for understanding the 'engineering' approach to flood management.

**Figure 4: Neuwied flood defence system, Rhine river, Germany**

This emphasis on flood defences was on the one hand driven by economic motives – for example making use for agricultural production of the fertile land of the floodplains (Johnson, Tunstall and Penning-Rowsell 2005). On the other hand it was often based on a belief in the ability to

control flood events technologically (Scrase and Sheate 2005). However flood events such as the aforementioned floods along the Rhine river in the early 1990s served as a wake-up call to the agencies and actors involved in flood management. The events highlighted that the engineering approach – in addition to further disadvantages such as negative environmental consequences and major investment and maintenance costs – fails even to offer the desired safety especially against the background of further increases in flood risk associated with climate change.

The lessons learned from these events led to the rise and adoption of a new approach to managing flooding – from a strong reliance on protective infrastructure such as dykes, walls, dams and embankments to a more adaptive and holistic bundle of measures. The former approach aimed at controlling and adjusting the natural process of flooding to the needs of human society and lost its persuasiveness in view of incidences of overtopping and failures of defences in recent flood events. The latter in a notable contrast pursued the goals of anticipating future flooding and adapting socio-economic processes to the natural cycle of water.

One of the earliest examples of the emerging approach was the transnational Rhine Flood Action Plan (RFAP) (ICPR 1998) that was developed in the aftermath of the 1993 and 1995 floods. Rather than focusing on the construction of new defences for one of the already most heavily modified water bodies of Europe it explicitly aims at restoring the natural characteristics of the Rhine river catchment and reducing the damage potential through a broader bundle of adaptive measures. These include dyke realignment (in order to make more space for water) as well as land-use planning and flood forecasting and warning (in order to ensure that values are kept out of harm's way). In parallel to the ICPR the LAWA (*Länderarbeitsgruppe Wasser*) (the water policy co-ordination body of the German states (the *Länder*) and the Federal government) developed influential flood management guidelines (LAWA 1995). The guidelines establish the principle that:

> [we] need to – like with other environmental issues – understand that we cannot use natural resources against nature but only in agreement with nature. (...) If one wants to reduce damage from flooding rapidly and sustainably, there is a greater chance for success in influencing the different uses near the river than only by shaping the course of the flood (ibid:19).

The guidelines therefore propose aspects of improving the natural water storage and precautionary land-use and construction regulation but also – in recognition of the possibility of floods that might overwhelm all flood management measures and damage existing assets – the use of commercial insurance as an individual private risk management strategy.

Another notable change in approach is reflected in a lessons learned report from Britain's Institute of Civil Engineers (ICE), an organisation traditionally involved in the implementation and design of the engineering-dominated approach. In its report entitled 'Learning to Live with Rivers' (ICE 2001), the ICE stresses the need to adapt socio-economic processes to nature. The responsible UK government department Defra (Department for the Environment, Food and Rural Affairs) followed suit by publishing a new strategy of flood management in 2005 named 'Making Space for Water' (DEFRA 2005). The new strategy includes provisions on the regulation of land-use, the use of natural water storage capacities through the (re)creation of wetlands and the improvement of flood warning and public awareness. As table 1 demonstrates, the policy initiatives for Germany's Rhine river and beyond (as well as in England) were not the only ones internationally in which anticipation and adaptation were emphasised.

| Country | Year | Selected initiatives/programmes/legislation |
|---|---|---|
| **France** | 1995 & 2005 | • Prévision des crues ainsi qu'à la transmission de l'information sur les crues (Decree of 12 January 2005 issued pursuant to Articles L. 564-1, L. 564-2 and L. 564-3 of the Environmental Code): *Monitoring and forecasting* of floods and the *communication of information on flooding* to the public.<br>. Plans de prévention des risques naturels prévisibles (Decree 95-1089, 1995 & 2005): Management plans for the prevention of *predictable* environmental risks. |
| **Switzerland** | 1993, 1994 & 1999 | • Bundesgesetz über den Wasserbau (Federal Act for Water Management 1993): *Risk assessments* and *anticipatory* flood management plans.<br>• Verordnung für den Wasserbau (Federal Decree for Water Management 1994, 1999): Safeguarding *retention and inundation* areas near rivers. |
| **Transboundary** | 1997-2003 & 2004-2006 | • IRMA-Interreg Rhine-Meuse Programme (1997-2003), including Belgium, France, Germany, Luxembourg and the Netherlands: *Spatial planning* projects for flood control.<br>• ELLA-Elbe-Labe *Preventive* Flood Management Measures through Transnational Spatial Planning (2004-2006), including Germany, Czech Republic, Poland and Hungary. |

| Country | Year | Selected initiatives/programmes/legislation |
|---|---|---|
| **Netherlands** | 2006 | • Ruimte voor de Rivier (Cabinet Decision 2006): *Room for rivers* by providing additional natural retention space. |

**Table 1: Selected policy initiatives of adaptive flood management in Europe**

Comment: *My emphasis* highlights anticipatory and adaptive emphasis in initiatives

As the table demonstrates the shift towards a more holistic and adaptive approach to flood management is an international, transboundary phenomenon. At the same time this shift implies a greater complexity of flood management. On the one hand the new approaches include a wide range of policy domains – as it recognises that water cannot always be kept within its 'natural' confines. As a consequence policy domains such as land use and the financial recovery from economic losses from flooding have become important components of flood management in addition to the traditionally important realm of water engineering and flood defences. On the other hand as the new approaches aim is to adapt socio-economic processes to natural processes that are no longer confined to river channels through engineering solutions flood managers need to anticipate future flood events more extensively. This can be done for example by assessing how, where and with what consequences the excessive water moves over land. It is in the context of organising the new approaches and anticipating future flooding that risk instruments emerge as increasingly important components of flood management. Risk instruments for flood management and their role in the emerging management approaches will be discussed in the following section.

## 2.3 RISK IN FLOOD MANAGEMENT

### 2.3.1 The rise of risk in emerging approaches to flood management

Risk is a central concept in many of the flood policy initiatives that have emerged in the 1990s and 2000s. This section aims at illustrating the wide use of and reference to risk in the recent policy initiatives.

Most notably the European Union recently agreed on a Directive on the assessment and management of flood risks (EC 2007) in October 2007. The directive makes it obligatory for EU members to develop risk instruments. More specifically, member states are to produce flood risk maps, undertake risk assessments and prepare risk management plans until 2015[8].

The risk instruments at the heart of this European flood regulation echo previous initiatives in European countries. One prominent example is the widespread development of flood maps, a spatial representation of different levels of risk. More specifically flood maps normally outline areas that are inundated during flood events of different probabilities (e.g. events with a statistical return period of 1-in-100 years). In addition to this basic type of flood map, maps can also take into account specific properties of the inundation (for instance, certain depth or flow velocity) and the particular consequences (for example, economic damage).

Even before the EU Directive made it obligatory for the member states to produce maps they had become a pervasive feature in the landscape of flood management in European countries. A stock-taking exercise by the transnational expert group EXCIMAP (European Exchange Circle on Flood Mapping) between 2006 and– 2007 illustrates the extent to which the instrument of flood maps has become available for flood management in Europe and beyond. The group's 2007 report (EXCIMAP 2007) presents flood maps of different types by 16 EU member states, for five

[8] The individual deadlines are: (i) preliminary risk assessments by end-2011, (ii) flood maps by end-2013, and (iii) risk management plans by end-2015.

transboundary river basins and by insurers in five EU member states – as the following table 2 summarises.

| Type of map | EXCIMAP's report (2007) |
|---|---|
| Flood maps of individual countries | Austria, Belgium, Croatia, Denmark, Britain, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Luxembourg, Netherlands, Norway, Poland, Spain, Sweden, Switzerland |
| Transboundary flood maps | Comrisk, Safecoast, ELLA, FLAPP, ICPR, SAFER, TIMIS[9] |
| Maps by insurers | CatNet, Austria, Czech Republic, France, Germany, Italy |
| Evacuation maps | Germany (Hamburg), Netherlands |

**Table 2: Examples of flood mapping in European countries**

However flood maps are only one (arguably important) example of the evolution and spread of risk instruments concerning flooding. The same basic calculations of the probabilities of water quantities and their distribution over land are used – along with, most importantly, assessments of damaging impact on values – for the catastrophe models often required and produced by international reinsurers. These are used to anticipate the financial consequences of major flood events with their accumulated losses on a reinsurer's solvency. Such models have been produced for different countries over the last decade with (for instance) a model by the reinsurer MunichRe available for Germany (simulating flood scenarios with different probabilities for eight different regions) being available since 2002 (Kron 2005:67). A similar model for inland flooding in England, Wales and Scotland is being offered by the commercial risk modeller RMS since 2001 (Lowe et al. 2008:29). Another example is that of flood forecasting and alert systems such as the recently developed European Flood Alert System

[9] COMRISK = Common Strategies to reduce the risk of storm floods in coastal lowlands; ELLA = Elbe-Labe Preventive Flood Management measures by transnational spatial planning; FLAPP = Flood Awareness and Prevention Policy in border areas; SAFER = Strategies and actions for flood emergency risk management; TIMIS = Transnational Internet Map Information System.

(EFAS), which is used to issue warnings to potentially affected regions. These draw on statistical calculations of water quantities and river channel profiles to predict the future flow of water and its consequences.

These national public and private mapping projects and other risk assessment efforts assume a central role in the emerging approaches to flood management as - to complement the earlier mention of the strong role for risk instruments in the recent EU Directive - the following references demonstrate. Germany's LAWA the inter-Länder co-ordination body for water politics remarks in its revised guidelines from 2004 that:

> "any forward-looking flood management concept requires the production of flood maps" (LAWA 2004:14).

Furthermore, the guidance notes that:

> "only knowledge about the threats makes a targeted precautionary flood management possible" (LAWA 2004:15).

Another explicit endorsement can be found in the new flood management strategy of Britain's Defra, which stresses the importance of maps and risk assessments more generally through its plans to:

> "develop the coverage and reliability of risk information and mapping. This improvement in the risk evidence base will drive our risk management activities". (Defra 2005:19).

This discussion of supranational and national policy initiatives – as well as the widespread use of the risk instrument of flood mapping – demonstrates that risk has become a key concept in the emerging approaches to flood management. But what exactly is meant by risk and risk instruments and in what ways can they contribute to flood management?

### 2.3.2 Understanding the concept and instruments of risk in flood management

In everyday language risk is about threats and dangers, about mishaps that may happen to someone – such as the inundation of one's basement. As an instrument in flood management however, risk assumes a different meaning

– namely that of particular quantitative measurements. These measurements most importantly revolve around statistical calculations. More concretely the calculations estimate the probability with which a certain event occurs. The concept of risk therefore is conventionally defined as the product of the probability and the consequences of specific events or processes. Risk instruments in turn provide and/or are based on the calculus of probability and consequences of events or processes.

In flood management actors take an interest in the probability with which certain water quantities occur. For instance a particular flood event is classified as a flood with a 1-in-100 years statistical return period or as a '*Jahrhunderthochwasser'* (centennial flood). In addition to this most fundamental risk calculation risk in flood management can combine the aforementioned probability of occurrence of certain water quantities with accounts of the consequences – that is the water's distribution over land and its effects on values. These calculations are undertaken and/or displayed through particular risk instruments. For example flood maps in their most basic form display the distribution over land of water quantities that occur with particular probabilities. Catastrophe models allow for an estimation of insurance losses for a range of flood events with different probabilities.

In this context it is useful to point to the different concepts of risk and hazard. Jones and Hood (1996) note that these concepts are in practice often mixed up. The authors clarify that the assessment of hazard (often undertaken by scientific and technical experts) normally is focused only on the causes of harm (i.e. excessive water quantities) and their management (i.e. managing water quantities through retention and channelling). In contrast risk assessment refers to a broader analytical task that also takes into account the economic and social consequences, and thus includes management measures that seek to reduce the exposure and the vulnerability of values to the damaging event. In the following discussions the concept of risk refers to both hazard and risk instruments. However as will be argued in particular in chapter 7 the distinction between hazard and risk marks an

important difference between the risk-based flood regimes of Germany and England.

Risk instruments in flood management draw on a long tradition of scientific and technological discovery. The modern science of hydrology that explores the motion and distribution of water on Earth was founded in the late 17th century when the French scientist Pierre Perrault discovered the rainfall–runoff relationship. Following these early steps the modelling of the relations between rainfall, runoff and hydraulic characteristics of a river channel made significant advances, from Thomas Mulvaney's development of the 'rational method' in 1850 (describing rainfall, runoff and catchment size relations) and the Stanford Watershed Model from 1962 (mathematically simulating river or stream flows) to recent flood flow models such as LISFLOOD-FP[10] from 1999 (using topographical data on floodplains to predict water diffusion). These calculations of the hazard's 'consequences', that is the motion of water over land, were linked to statistical assessments of probabilities.

The statistical understanding of extreme value distributions was improved following the work of Emil Gumbel (who came up with the so-called Gumbel distribution) in the 1940s. These statistical functions were fed with the systematically gathered data on rainfall and river flow (e.g. Dresden's Elbe gauge has recorded water levels since 1775) so that the statistical estimation of different flood scenarios became increasingly sophisticated. The advancement of technologies since the 1990s –, most notably the increased computing power, the laser scanning of terrain that allows the production of digital terrain models and initiatives to assess the value of land use[11] –further boosted the analytical capacities of flood managers. Nowadays as Britain's Institute of Civil Engineers boldly notes:

[10] LISFLOOD-FP was developed by the University of Bristol and the EU's Joint research centres (EC-JRC). It is mostly used for larger river catchments such as the Danube. It also forms the underlying hydrological model for the EC-JRC's European Flood Alert System.

[11] One prominent example is the CORINE database on land cover initiated by the European Union in the mid-1980s. Based on satellite images different categories of land use are

> "there are methodologies available to engineers that can allow relatively accurate predictions of where flooding will occur and, given a particular magnitude of the flood, the extent of flooding, duration, rate of rise, flood depths, velocities, and damage can all be predicted" (2001:15).

As the ICE's statement suggests these calculations of risk provide different insights that benefit flood managers. For instance they allow for spatial differentiation between areas with different risk levels (as e.g. displayed on flood maps), the calculation of total and annual average economic losses from flooding (as e.g. undertaken through catastrophe models) and the evaluation of locations for flood management interventions in which they yield the greatest benefits (as e.g. undertaken through risk assessments that identify and quantify the probable damage for a particular area).

These benefits mostly focus on an informational role for the concept and instruments of risk in flood management. However risk can have further applications in flood management. The following table distinguishing between three risk management functions as defined for Hood and colleagues' risk regulation regimes (Hood, Rothstein and Baldwin 2004) illustrates additional functions of risk in flood management.

| Functions | Details | Examples |
|---|---|---|
| **Detecting** | Assessments of probability and consequences | Flood mapping across Europe |
| **Directing** | Risk-based definition of management goals | Dutch safety standard of 1/1,250 |
| **Effecting** | Risk-based design and selection of implementation measures | Financial risk transfer through flood insurance |

**Table 3: Risk regulation regime functions in risk-based flood management**

On the one hand risk can help define goals and standards in flood management (the 'directing' function). One example is the setting of

identified among them agriculture, urban/residential and industrial/commercial/transport. These in turn can be linked to particular damage potential values.

minimal safety standards – in particular for flood defences. For instance the Dutch statutory standard for protection from riverine flooding is to ensure that water quantities that occur with a 1-in-1,250 years or higher probability do not cause harm. On the other hand risk can play an important role in designing and selecting measures to achieve the flood management goals (the 'effecting' function). One risk-based mechanism to manage and reduce economic losses from flooding is insurance. Insurance implies that an insurer indemnifies an individual that incurred economic losses from flooding in exchange for the regular payment of a premium. Risk is at the heart of this transaction because the premium reflects – at least in economic theory (Priest 1996) – the price for the amount of (financial) risk that is transferred from the client to the insurer.

## 2.4 Conclusions: The issue area of flood management and risk-based governance

Why does a study of flood management promise to yield relevant results for the discussion of diversity in risk-based governance? On the one hand risk can be expected to matter in flood management. As this chapter's discussion showed flood managers are in general likely to make use of risk instruments for a number of reasons. First, this is because advanced risk assessment instruments have become available thanks to advances in computing technology, data collection and modelling methods. Second, it is because specialists in water management science and practice are familiar with probabilistic analyses reflecting the historical evolution in the sciences of hydrology and statistics. A third reason is that there has been a shift towards more adaptive and anticipatory approaches to flood management for which risk calculations are deemed essential as a basis for decision-making.

On the other hand the cases of Germany's and England's flood regimes offer some substantial contrasts; – from who helps disaster victims to recover from flooding to the restrictiveness and scope of land-use regulation to how the state's money is allocated to flood defence projects (as noted in chapter 1). Are these different ways of organising different policy

domains of flood regimes also linked to diversity in the use of the concept and instruments of risk? And how can this diversity be squared with the wider trends of convergence towards more anticipatory and adaptive flood management reflected in transnational (the river commissions) and supranational policy integration (the EU Flood Directive) as well as the international diffusion of particular policy templates (often carrying variations of the name ‘making space for water’)?

Finally, flood management promises also a particularly rich harvest for a comparison. This is because of the manifold roles risk can assume in flood management regimes. Do risk assessments directly shape standard-setting? Which conceptualisation of risk, hazard or risk, matters in standard-setting and in the implementation of measures? Are resources for implementation allocated in accordance to different levels of risk? This is also because the regimes stretch across several distinctive policy domains, ranging most prominently from the public investment into flood protection infrastructure through the regulation of land use to the financing of disaster damages. Similar questions as with the different regime functions need to be asked here as well. To what extent does risk matter in each domain? Which conceptualisation of risk matters? Are the same concepts used across all policy domains?

## CHAPTER 3: ANALYSING RISK IN GOVERNANCE. FROM THEORY TO COMPARATIVE RESEARCH

The proliferation of risk instruments and the use of statistical probabilities to describe policy challenges are not restricted to the field of flood management. Rather as O'Malley notes it seems:

> "no longer necessary to draw (...) attention to the fact that risk-based routines and practices of government pervade most areas of life" (2004:1).

It is not only the practices of states and governments that are increasingly risk-based. In fact Power finds the origins for the 'risk management of everything' in the private sector especially in finance. He observes that:

> "risk management and risk 'talk' are all around us. The risk-based description of organisational life is conspicuous. Not only private sector companies, but hospitals, schools, universities and many other public organisations, including the very highest levels of central government, have all been invaded to varying degrees by ideas about risk and its management" (Power 2004:9).

The proposed ubiquity of risk in government and other organisational life raises a number of questions that have been answered in the literature in different ways and it has inspired this comparative study of risk-based flood management. These questions concern the extent to which risk-based governance is a universal and uniform phenomenon and if not, what different forms of risk-based governance emerge, what drives and hinders its adoption, and – if different forms emerge – which variables shape them.

The following sections discuss the scholarly literature concerned with risk in governance and identify the need for an in-depth comparative study of risk-based governance regimes. This is followed by a discussion of the neo-institutionalist perspective that is chosen as an explanatory approach for this comparative study.

### 3.1 UNDERSTANDING RISK IN GOVERNANCE

Flood maps are one example for risk instruments. They rely among other inputs on mathematical advances such as Gumbel's extreme value distribution and systematically gathered data – such as those collected from Dresden's gauge since 1775. These underlying calculations highlight that the concept of risk refers to a particular measurement representing 'a specific mode of treatment of certain events' (Ewald 1991:199). More specifically once the concept of risk is being used a potential danger (i.e. something that is liable to cause harm) has been assessed in terms of the likelihood that these effects will occur and the weight of the harm. Risk therefore contains quantitative and statistical measurement.

This measurement is undertaken by actors embedded in an uncertain world associated with numerous possibilities. In such a context of uncertainty possibilities of mischance are a necessary complement to any planned, future-oriented human action. As a result mechanisms to control such mischance have a rich history as their presence in the history of auguries, omens and prophecies shows. However mechanisms of control have changed throughout history with modern societies increasingly relying on advances in science, mathematics and systematic data-gathering to produce the probabilistic 'measurements' of future events associated with the concept of risk. These particular measures have evolved over centuries as scholars such as Ian Hacking and Peter Bernstein show.

Hacking (1990; 1991) observes that in the 19th century an 'avalanche of numbers' was systematically collected – as, among other initiatives, the first population census in Britain (1801) demonstrates. Based on these numbers and the development of statistical concepts such as the Law of Large Numbers[12] and Gauss' Normal Distribution,[13] statistical regularities in the observations were revealed on the basis of which 'statistical laws' were

[12] This law denotes the mathematical fact that irregularities in mass phenomena would fade out if enough data were gathered.
[13] The bell-shaped curve associated with the normal distribution shows the distribution of a variable (such as height of men) around the mean (average).

formulated. These laws 'tamed' the chance associated with an uncertain future. For instance it was suggested that there is a specific likelihood for all kinds of phenomena, from physical ones, such as the velocity of molecules (Maxwell Distribution of Molecular Velocities from 1859) to social ones, for instance suicide rates among divorcees (Willcox 1891).

Bernstein (1996) takes the reader back even further on a long journey through the history, roots and applications of the concept of risk. He notes how the early development in the theory of probability (such as Blaise 'Pascal's triangle'[14] in the 17th century) was concerned with resolving mathematical (and gambling) puzzles. Like Hacking however, Bernstein also shows how probability calculations and statistics found increasing application in political and commercial practices from the 18th century onwards with early life expectancy tables[15] that provided new foundations to the government and insurance business of life annuities;[16] the increasingly systematic information-gathering on maritime trade and shipping through the London-based insurance collective Lloyd's to enable the underwriting of international commerce; and the use of statistics from the population census in Britain by the Victorian social reformers to remedy the ills of industrialisation.

Bernstein and Hacking therefore not only demonstrate advances in probability and statistical sciences that allowed for attempts to devise future-oriented statistical laws even for society and concerning social facts, but their arguments also link the use of risk to governance. Bernstein points to Victorian social reformers and commercial insurers and Hacking to the

[14] 'Pascal's Triangle' displays the possible outcomes (e.g. head (H) or tail (T)) of certain processes (e.g. the tossing of one or more coins) and allows for the calculation of the probability of a particular outcome (e.g. the probability of a 'head' when tossing two coins is 75% due to the possible outcomes: HH, HT, TH, TT).

[15] Life expectancy tables show for different ages what the probability is that a person of that age will die before his next birthday.

[16] Life annuities is a financial product for which the issuer makes a series of *future* payments to a buyer in exchange for the *immediate* payment of a lump sum or a series of regular payments prior to the onset of aforementioned future payments. Being able to estimate the duration of future payments is crucial to define profitable levels of immediate payment.

emergence of a bureaucracy of statistics as collective actors that make use of risk and associated statistical instruments to address harms such as epidemics, losses in maritime trading, poverty in old age and more.

At the same time Bernstein is highly critical of using statistics for governing socio-economic processes in particular. Probabilistic prediction produces a 'prison' based on the repetition of historical statistical patterns. Given this perception of statistical laws and statistics-based governance Bernstein endorses critical arguments on statistics brought forward by the two economists Frank Knight (1921) and John Maynard Keynes (1921). Knight (based on observations of surprises in the world of business in spite of then widely shared assumptions of either perfect certainty or reliably established laws of probability) argues that as any given decision (in the business world and beyond) is unique, no meaningful probabilistic inference can be drawn concerning future conduct. Similarly Keynes attacked the idea of inference from past instances to the future. Both Keynes and Knight put the idea of uncertainty into the centre of economic processes. An uncertain future is different from a probabilistically assessed future because there is a fundamental lack of knowledge on future outcomes. Bernstein celebrates this uncertainty:

> "Rather than frightening us, Keynes' words ('we simply don't know') bring great news: we are not prisoners of an inevitable future. Uncertainty makes us free" (1996:229).

Hacking also has rather critical views on using risk in governance. He describes the emergence of probability as an effective control instrument, in fact so effective that:

> "it is a glib but true generalisation that proletarian revolutions have never occurred in any state whose assurantial technology was working properly" (1991:184).

The contributions of these two scholars raise important questions. As statistical laws – argued forcefully as early as in the 1920s by two influential economists – have attracted substantial criticism (in particular in the context

of predicting and governing socio-economic processes) why does Michael Power in 2004 observe the 'risk management of everything', and why does Pat O'Malley perceive in his book from the same year that risk-based routine and practices are pervasive for governing most areas of life (O'Malley 2004; Power 2004)? Were Keynes and Knight wrong with their critiques? Or is it important to consider other variables such as the objectives of the bureaucracy of statistics, as Hacking's account implies?

Recent discussions on risk in governance come in two broad categories namely governance-of-risk and governance-by-risk. In the governance-of-risk category the focus is on how changes in technology and culture have increased our anxiety about the potential dangers faced by society. The governance-of-risk is concerned with dealing with these potential dangers with the state and other actors acting as risk managers. While the anxieties are partly due to modern societies' advanced capacity for risk assessment – and successful risk management in the past that has given rise to zero-risk expectations – the governance-of-risk does not necessarily assign a major role to risk instruments in general and particular forms of risk instruments in particular in governance.

Such a central role for the concept and instruments of risk in governance is the focus of the governance-by-risk debate, however. In this context risk no longer is the object or target of governance but the risk concept (along with its calculus and instruments) are used to organise the governance of a particular process object or group – such as property development on floodplains or risk-taking of financial institutions – in particular, 'risk-based' manner. In Rothstein and colleagues' words:

> "risk-based regulation can be conceived as allocating resources in proportion to risks to society (such as health, safety or environmental risks), considering both the impacts themselves and the likelihood that they happen, in order to establish appropriate levels of control" (2006b:1057).

While this definition as will be illustrated below already refers to one particular form of risk-based governance it is instructive to highlight that in addition to managing particular threats to society, risk governance can be about the organisation of governance. This debate therefore raises questions such as how and why the concept and instruments of risk have become central for organising governance.

### 3.1.1 Governance of Risk

The governance of risk through state and non-state actors is nothing new. Governments have always provided particular risk management services even though they may not have been labelled as risk management – such as securing internal peace and order and defence against foreign invasion (Lowi 1990). Scholars have suggested that the role of governments in risk management has been growing in particular throughout the 20$^{th}$ century – for example in the form of the welfare state that assumes risks such as poverty, old age and health (Friedman 1981). Similarly organisations such as insurance companies have, as seen in the reference to their services by Bernstein, been involved in activities of risk management for a long time.

The growing role of risk in governance in the sense of 'governance-of-risk' has been explained in different ways. One argument originates from Anthony Giddens (1991; 1999). He argues that as modernity weakens old hierarchical restraints (for example, towards the church), opens access to new sources of knowledge (for instance through mass education) and creates institutions such as the mass media, people in contemporary, late-modern societies focus much more than in the past on potential harm. This public attention forces the state to govern risks. While the potential for harm may not have changed the awareness and knowledge of risks among the population has increased, resulting in increased demands for the government's risk management by increasingly confident, reflexive citizens.

A related argument has been proposed by Beck (1992; 1999). However in addition to the more demanding citizens of late modernity, he

suggests that as a result of the scale of modern organisation and the nature of modern technologies new kinds of potentially catastrophic threats have emerged (such as nuclear power and associated radioactive accidents). This increases the demands for (and on) risk management.

While Beck's and Giddens' arguments embed the increasing demand for the governance-of-risk in macro-level narratives about epochal shifts to late or reflexive modernity other scholars have taken a closer look as to the particular drivers of the governance-of-risk. One important argument is exploring public opinion as a driver. More specifically it is argued that in the aftermath of disasters or major accidents the public outrage or panic implies public pressure on the government that results in increased activities to govern risk (Burgess 2002; 2009). Slightly cynically Hood and colleagues (2004) call the post-disaster regulatory initiatives as the 'tombstone' patterns, with the regulations constituting 'monuments of public emotions about past tragedies' (ibid.:110). Finally, Lodge and Hood (2002) point out that even small events can have big consequences if particular circumstances (e.g. absence of rival stories, innocent victims) lead to a strong media response.

Another argument for the governance of risk is pressure from interest groups. There are groups of (potential) victims of dangerous activities such as NIMBY[17] organisations fighting the siting of waste incineration plants or those representing broader causes (such as environmental groups) that advocate for tighter regulation and the adoption of the precautionary principle in respect to various potential hazards. Moreover business interests – often assumed to be critical of regulation as organisations responsible for major hazards – also have reasons to be in favour of risk regulation (Stigler 1984). Tight environmental standards for example can benefit technological leaders or larger companies at the expense of laggards and smaller companies that have to bear larger compliance costs. Finally, there is an

[17] 'Not in my backyard' (NIMBY) refers to local protests against decisions and activities that affect local values.

argument about bureaucracies in charge of managing particular risks that seek to expand and shape their bureaucratic empires and thus attempting to increase the salience of a particular risk (Niskanen 1971; Dunleavy 1991).

As these different arguments demonstrate risk has become a central concern for advanced industrialised societies for which collective solutions either devised by state or non-state actors had to be developed. This concern is driven by the increasing sensitivity, information and expectations of the population concerning potential threats to its security in late modernity. The anxieties of the population are fed by disasters and amplified by public interest groups and mass media that pressurise and/or mobilise the government and other organisations to provide risk management services. In addition to public pressures on policy-makers economic and bureaucratic interest groups may exercise pressure on policy-makers to expand the governance-of-risk.

The growing importance of the governance of risk may also point to an increased use of risk instruments and to a rise in governance-by-risk. As Beck puts it concerning the new types of modernity risks: 'no amount of collective coughing, scratching and sighing helps. Only science does' (1992b:212). However ultimately risk in this context primarily refers to the possibility of harm and the governance-of-risk is about any kind of intervention that addresses this threat.

A rise in the governance-of-risk is thus not necessarily related to a rise in the governance-by-risk. This separation is reasonable because on the one hand there are alternative means to deal with such potential dangers. O'Malley (2004) points to for instance rule-of-thumb, informed guesses and more as mechanisms to handle uncertainty. Moreover rather than using risk to anticipate future harm governance interventions may be limited to remedial, post-disaster measures that do not necessarily rely on any forecasts or predictions. On the other hand there are strong reasons why quantitative risk instruments may in fact have a rather limited impact on the governance of risk. Most notably public pressure to regulate can actually result in

governance that runs counter to probabilistic assessments as a result of biases in public risk perception (Kahnemann and Tversky 1973; Slovic 2000) and the social amplification of risk (Pidgeon et al. 2003).

However if public pressure and risk perception as well as the problems of inference from the past to future behaviour (as argued by Knight and Keynes) highlight potential shortcomings and barriers to risk-based governance, then contributions emphasising the 'attractions of risk-based regulation' (Hutter 2005) and its pervasiveness seem puzzling. The puzzling popularity of governance-by-risk will be discussed in the next section.

### 3.1.2 Governance by Risk

The rise and the expanding range of applications of statistics in the 18th and 19th century in governance – as described by Hacking and Bernstein – illustrates the potential of risk instruments to inform governance. One example of the impact that Hacking mentions is the case of medical statistics, in particular the canonical list of causes of death established during the 19th century. As Hacking remarks:

> "in most parts of the world, it has long been illegal to die of anything except causes on the official list – although the list is regularly revised. It is illegal, for example, to die of old age" (1991:183).

Hacking associates the rise of statistics in governance with that of the industrial state. Statistical analysis offered particular benefits relevant to the industrialising state in terms of its legitimacy, solvency and in the exercise of control over the population. More specifically statistics helped with the provision of large-scale services (public health services for preventing epidemic diseases), the extraction of resources (soldiers for large armies for European wars; tax revenue) and capital formation through social insurance (life annuities). Statistics helped as well in ensuring control and order through the classification of population through which individuals define themselves and the actions that are open to them (as seen above, 'dying of old age' is not open to them).

Risk calculus in governance may therefore have further functions than simply an improved public administration based on better predictions of an uncertain future. This as will be discussed below is also at the heart of the scholarly contributions to the rise of governance-by-risk.

***The popularity of risk-based governance***

Governance-by-risk seems rather popular in advanced, capitalist societies. For Britain's former Prime Minister Tony Blair for instance, risk is to become '*the* governing concept' (Blair 2005) in all changes of regulation in order to avoid stifling science, business and public service delivery through excessive measures for harm avoidance. The European Commission notes that:

> "risk governance–embracing risk identification, assessment, management and communication – has become a *crucial* (...) component of public policy" (EC 2002:23).

For instance beyond the Flood Directive the EU's risk-based approach to governance has been adopted for the management of food safety for which the Food Safety Regulation requires a three-stage approach of risk assessment/analysis, management and communication (EC 2002a:17). A recent report by the Organization for Economic Co-operation and Development (OECD) (2009) analysed the progress made in six member states including Britain, Canada, the United States the Netherlands, Japan and Singapore concerning the all-hazard approaches to managing the risks facing their populations and territories. The report notes that all surveyed countries 'have set course' (ibid:38) to implement such approaches with better risk assessment capacities, improved co-ordination between government agencies and preventative mitigation policies. Finally, Rothstein and colleagues (2006b) note that New Zealand and Australia along with Britain and Canada have also been found to adopt risk-based approaches to regulation.

These accounts of risk-based governance highlight on the one hand that governance-by-risk is widely adopted internationally and across

different policy areas. On the other hand it can be observed that in addition to anticipating and managing specific threats, risk is to serve as a tool for improved co-ordination, prioritisation and effectiveness of governance. This is achieved through (risk-)proportionate allocation of resources and by ensuring the effectiveness and the efficiency of public interventions. Britain's Environment Agency (EA) in a strategy document on environmental management for the '21st century' (EA 2005) highlights that such targeted and proportionate interventions maximise their benefits while reducing the regulatory burden on the targeted groups and processes. Similar arguments are made by the OECD where risk-based governance implies being capable of 'targeting mitigation investments to their greatest benefits' (2009:5). These additional benefits of the concept and instruments of risk in governance matter substantially for some of the theoretical arguments about the rise of risk-based governance. More specifically risk instruments can be used to improve collective problem-solving capacities since the state's legitimacy and effectiveness as a problem-solver is being challenged in different ways by the proponents of the theoretical perspectives discussed below.

***Explaining the rise of governance-by-risk***

Like Hacking (industrial society) and Beck (risk society) recent contributions on the rise of risk-based governance embed this particular form of governance in a context with specific political and politico-economic characteristics in which the potential dangers are being managed. Two broad types of arguments can be discerned. The first type of argument challenges the state's capabilities as an effective risk manager. Risk instruments offer means to address these challenges. The second type of argument highlights increased pressures of transparency and accountability that risk managers within governments face. Again risk instruments can be argued to help respond to these pressures.

***Challenging the state as an effective risk manager***

Two sets of arguments relate to the post-war state in crisis and discuss risk as a possible means to resolve the failures of the state as an effective risk manager, namely arguments from a neoliberalism perspective and those related to the regulatory state.

The first set of arguments is associated with the rise and critique of neoliberal ideas. In general commentators on neoliberalism examine shifts in the relations between state, market and society in managing risks. Neoliberalism is generally associated with a rather negative perception of the state – mostly as economically wasteful and inefficient, stifling private (economic) initiative and undermining the assumption of responsibility for their actions by individuals. In contrast neoliberalism's proponents emphasise the superiority of markets and the price mechanisms to allocate resources and regulate individual behaviour as well as seeking to promote the individual responsibility for managing risks. Neoliberal advocates thus promote the 'roll-back' and reconfiguration of the state.

The beginnings of 'neoliberalism' as a political and ideological project are usually dated back to the mid-20$^{th}$ century. Friedrich Hayek and Milton Friedman are credited as the intellectual forefathers of the neoliberal project in opposition to the prevailing economic policies and thoughts inspired by the writings of Keynes. Such Keynes-inspired economic policies emphasise the possibility (even necessity) of beneficial economic policy interventions by the state to prevent unemployment and recessions – for instance through setting-up an extensive welfare state, state-owned companies and macro-economic interventions such as deficit spending in a recession. These neoliberal ideas were spread through think tanks and converted into 'neoliberal conviction politics' (Peck and Tickell 2002:388) initially – most prominently under Ronald Reagan's U.S. government and Britain's Thatcher government that weakened the central institutions of the post-war Keynesian-welfarist settlements. This implied the dismantling of the welfare state, the deregulation and liberalisation of markets, a monetarist

macro-economic management and the privatisation of state-owned companies.

At the same time as Peck and Tickell (2002) point out, this 'roll-back' of the state culminated in economic and other crises in the early 1990s, especially in the Anglo-Saxon neoliberal heartland, which in turn led to a reconstitution of the neoliberal project as epitomised by the socially interventionist and ameliorative Third Way of the governments of Bill Clinton and Tony Blair since the 1990s. This suggested that 'roll-out' neoliberalism engages in regulatory institution-building addressing some of the shortcomings of the neoliberalisation of economic management as well as government interventions primarily concerning the disciplining of those marginalised or dispossessed by the neoliberalisation of the 1980s.

While the U.S. and the U.K. are normally seen as early movers in adopting neoliberal ideas and implementing associated policies, critical commentators of neoliberalism have noted that associated ideas 'seems to be everywhere' (Peck and Tickell 2002:380). This is reflected in a large number of case studies of neoliberalisation of water and forest governance, macro-economic management, welfare regimes, or international trade policies in different geographical regions and on various governance levels (Castree 2008a; 2008b).

There are three interrelated dimensions to neoliberalism that are relevant to explaining a rise in risk-based governance. First, the character of the state changes in a neoliberal political economy. Second, through its emphasis on markets risk management in neoliberalism increasingly relies on commercial insurance and individuals themselves. Third, the changes in statehood and the expansion of markets are aspects of a broader promotion of an economic rationality in decision-making across all policy sectors.

The first dimension is concerned with the changing character of the state. The embeddedness of states within a globalised competitive environment transforms them into 'competition states' whose primary policy

goal is economic growth (Cerny 1990; 2008)[18]. Such competition states contrast remarkably with the type of a modern nation state associated with labels such as the welfare state. This welfarist type of nation state revolved around 'public interest' and 'general welfare' to be accomplished through 'decommodifying' key areas of public policy:

> "in order to protect strategic industries or financial institutions, bail out consumers or investors, build infrastructure, counteract business cycles, and integrate workers into cooperating with the capitalist process through unionisation, corporatism, the welfare state, and the like" (Cerny 2008:13).

The competition state however, argues Cerny, is actually concerned with the 'commodification' of the state to promote domestic competitiveness and reduce the burden and costs of the state. Such a 'commodification' includes:

> "streamlining and marketizing state intervention in the economy and (...) reorganizing the state itself according to organizational practices and procedures drawn from private business" (ibid).

Risk can be argued to play an instrumental role within 'competition states' and to promote practices of neoliberal governance. Risk instruments allow for more 'targeted' and 'proportionate' state interventions, thereby reducing the burden of overregulation and ensuring a more effective use of state resources (Hutter 2005; Rothstein, Irving, Walden et al. 2006b). From this perspective risk instruments rather than solely serving to manage the actual threat of harm to values ensure competitiveness of state and societies in a global marketplace.

[18] Cerny's 'competition state' is not the only label assigned to the reconfigured state inspired by neoliberal ideas. Jessop (1993), for example, argues that the Keynesian welfare state is replaced by the Schumpeterian workfare state. The new form of state is said to "promote product, process, organizational, and market innovation and enhance the structural competitiveness of open economies mainly through supply-side intervention; and to subordinate social policy to the demands of labour market flexibility and structural competitiveness" (ibid:3).

A second dimension is the emphasis on markets in neoliberalism. In the specific field of risk management the crucial market is the insurance market. Ericson and Doyle note that:

> "the role of the state is changing rapidly, and with it the mechanisms of governance. (...) In this era of governance through liberal risk regimes, one would expect the private insurance industry to take up some ground left by the downsizing of the state" (2003:6).

Insurance in a neoliberal context differs from the insurance mechanisms that have emerged throughout the 20th century for the welfare state. In welfare states the paradigm was 'more insurance for more people' and insurance served as a means to distribute risks as widely as possible to manage them collectively (Ewald 2002). However this approach to insurance has been heavily criticised by neoliberal advocates because of the consequences it had on individual behaviour namely the problem of moral hazard (Baker and Simon 2002b; Heimer 2002). Moral hazard refers to the fact that once insured individuals behave in a more negligent and/or risk-taking manner than if they were uninsured (Arrow 1971). From a neoliberal perspective the financial problems of the social insurance systems and the crisis of welfare states is a result of moral hazard and the perverse incentives created through social insurance. Allowing private insurers to differentiate between different clients in terms of premiums and other contract conditions enables them to set economic incentives for their insurance clients that encourage them to avoid risk-taking and even engage in risk mitigation (Priest 1996; Harrington 2000).

Risk instruments – primarily those that help determining different levels of risk exposure – are central for insurance-based risk management as promoted by advocates of neoliberalism. In contrast to the insurance systems under the welfare state where the size of the risk pool and the idea of risk redistribution were crucial, 'neoliberal' insurance aims at differentiating the risk pool in accordance to different levels of risk. This differentiation is important for the profitability of the insurance industry (to be able to charge

competitive rates and avoid excessive exposure to 'bad' risks and associated financial losses), as well as to enable individuals to manage their risk effectively (by finding a balance between risk transfer to insurance and risk mitigation/avoidance). Through neoliberal insurance individuals are turned into 'agents of prevention' (Ericson, Doyle and Barry 2003) and made to 'embrace risks' (Baker and Simon 2002a).

The third dimension is including aspects of the emergence of 'competition states' and insurance in 'liberal risk regimes' (Ericson, Doyle and Barry 2003) in the more comprehensive concept of an economic 'political rationality' associated with neoliberal 'governmentality'. Inspired by a Foucauldian perspective neoliberalism in this context means that an economic political rationality – for instance associated with cost-benefit assessments – is colonizing all realms of society as well as the assessments and conduct of individual and collective actors. Foucault speaks of 'a kind of permanent economic tribunal' (quoted in Lemke 2001:198) and that 'it is the market form that serves as the organisational principle for the state and society' (quoted in Lemke 2001:200). The ideas of a 'tribunal' (as an institution evaluating and judging on courses of action against particular criteria) and 'organising principle' (as a set of guidance that prescribes a particular order) reflect Foucault's concepts of 'governmentality' and 'political rationality' that link techniques of power to particular forms of knowledge. Risk instruments can underpin the economic political rationality by providing quantitative, comparable, often even monetary values of the adverse outcomes of different courses of action. For instance avoided risk is a term that can be used to account for benefits in cost-benefit assessments of certain risk management measures.

In short risk instruments can be argued to fit well with shifts towards a competition state and neoliberalism. As many commentators on neoliberalism treat its emergence and dominance as an international phenomenon risk-based governance can be expected to be an equally international phenomenon. However it is important to note that the

arguments about the universal emergence of neoliberal forms of governance have been contested.

The most fundamental attack on neoliberalism has been the epistemological challenge of the analytical object of neoliberalism. The uniqueness, specificity and amorphousness of many case studies analysed under the common label of neoliberalism have led Barnett to claim that 'there is no such thing as neoliberalism' (2005:9) as a coherent hegemonic project raising doubts about the usefulness of the 'neoliberalisation' query as an analytical starting point. Castree (2008a; 2008b) however suggests that research into the 'neoliberalisation' of institutional settings and policies should focus on identifying the substantive commonalities in causal processes but acknowledge that 'neoliberalisation' always takes place jointly with other contextual drivers. Substantive commonalities with respect to 'neoliberalisation' may even sometimes be so limited that 'neoliberalisation' in a particular case only exists conceptually but not in actuality. Moreover Jessop points out that there are tendencies and countertendencies towards the 'neo-liberal' reconfiguration of the state. It is therefore

> "imperative to study 'actually existing neoliberalisms' to understand how their dynamic and viability are shaped by specific path-dependent contexts, competing discourses, strategies and organizational paradigms, and the balance of forces associated with different projects" (2002:457).

These critical perspectives suggest that neoliberalism and the associated reconfiguration of statehood, state-society relations and governmentality are taking place, but that they may differ in their nature. Following Jessop's advice this study analyses the role of risk instruments in flood management in two concrete country cases – with sensitivity towards the differences in the cases' degrees of 'neoliberalisation'.

The second set of arguments emerges in relation to the 'rise of the regulatory state' debate. The 'regulatory state' debate is not concerned about shifts in the relation between state, market and society but focuses on the weight of different types of tools with which governments pursue their goals.

More specifically Majone (Majone 1997) argued that there was a shift in the emphasis in state activities from redistribution and stabilisation to regulation. This is normally attributed to the fact that the Keynesian post-war state has been exhausted financially and its legitimacy has been in decline due to its poor economic performance in the 1970s and 1980s in the advanced industrialised countries of Europe. The 'regulatory state' offers a response: The costs of regulatory interventions are mostly borne by the regulated entity rather than the state, and the authorities of the regulatory state are specialised agencies that autonomously engage in expertise-based problem-solving.

From a European perspective this shift to formalised regulation has marked a change from policies of nationalisation and an informal application of laws that have been described as being more typical for the western European post-war states – in particular Britain (Vogel 1986; Levi-Faur and Gilad 2004). From a U.S. viewpoint however the legalistic application of formal rules is nothing new. Formal regulation enforced by independent regulators emerged in the Progressive Era of the 1930s – mostly focusing on the regulation of economic sectors (for example competition rules) – and was expanded strongly to include social regulation (for instance health and safety regulations) between the 1960s and 1980s.

In contrast to the European perspectives the American literature does not see the regulatory state positively as a solution to the interventionist state's failings but is more critical. For instance there have been arguments that the regulatory state and its agencies can be captured by organised interests (Bernstein 1955; Stigler 1984). It may also be ineffective in the pursuit of its objectives since it fails to implement the regulations, in particular the more recent social regulations (Stewart 1983; Stigler 1984). A closely related challenge to the implementation of such 'failure' arguments is that the regulatory state requires the investment of substantial resources (for instance for inspections) by the state and overburdens the regulatees (Hutter 2005).

One response to these failures was the rise of strong 'deregulation rhetoric' (Hutter 2005) in the 1980s and 1990s. Another one was the promotion of regulatory reforms in the 1990s that were partially overlapping with the aims of the deregulation rhetoric (Radaelli 2007). Most notably 'better regulation' became the buzzword in the 1990s and early 2000s – with international agencies such as the European Commission (EC 2001; Mandelkern-Group 2001; EC 2002) and the OECD (OECD 1995) promoting it as part of a wider modernisation of the state. 'Better regulation' is basically about policies, tools and institutions that ensure that regulations generate overall economic and wider societal benefits rather than excessively burdening regulatees and that regulatory resources are deployed more effectively. This is to be achieved by making rules simpler, consistent, more transparent and accessible, more targeted and proportional, and with a clear accountability (OECD 1995; Mandelkern-Group 2001; BRTF 2005).

Risk-based regulation is particularly relevant in the context of the 'better regulation' debate. More specifically the use of the concept and instruments of risk in regulation implies a potentially more targeted and efficient (in terms of its regulatory resource use) regulation as well as greater transparency and accountability. This is because regulatory resources can be deployed to those regulatees that can potentially cause the greatest harm. At the same time those with a lower potential to cause harm are burdened less by regulatory interventions. Moreover as Black (2005) points out risk-based regulation makes explicit which risks the regulator deems acceptable and which not and thus does or does not allocate resources to.

While 'better regulation' along with risk-based regulation (Rothstein, Irwin et al. 2006) has been described as an international phenomenon, commentators (Radaelli 2004) highlight that regulatory reforms differ in terms of contents and pace. It is therefore interesting to see whether and how 'better regulation' rationales (avoiding overregulation, improving compliance, allocating regulatory resources more effectively) have led to the adoption of risk-based regulation in flood management regimes – and

whether this has been the case in the same way for different institutional contexts.

***Challenging the state as a legitimate risk manager***

Perspectives on neoliberalism and the shortcomings of the regulatory state focus on how the state fails to govern effectively. Concretely, regulatory and other resources are not allocated efficiently and state interventions overburden and set the wrong incentives ('moral hazard') for private actors. From a neoliberal perspective an inefficient state and a crowded-out private sector undermine the capacity of a society to compete (for international investments, talent and other desiderata) in a globalised economy.

Another pressure on the state is an increased emphasis on holding the state accountable for its interventions. Accountability can be defined as:

> "a liability to reveal, to explain, and to justify what one does; how one discharges responsibilities, financial or other, whose several origins may be political, constitutional, hierarchical or contractual" (Normanton 1971:311).

Accountability pressures beyond the traditional constitutional obligations of the government and bureaucrats to be accountable to Parliament, ministers and to courts have been argued to be rising in European countries. This is on the one hand a result of changes in society – including the availability and dissemination of information through various sources (NGOs, Internet) and mechanisms (freedom of information requirements, corporate reporting). Moreover governments themselves have subscribed to the principles of transparency and accountability through the international promotion of concepts such as 'good governance' (EC 2001) and requirements for greater transparency under, for example, the Aarhus Convention on freedom of access to environmental information at European and international levels.

On the other hand an argument can be made that the traditional control mechanisms (Parliament; courts) no longer suffice to hold modern governments accountable (Harden 1995; Graham 1997). As a matter of fact

Hood and colleagues are pointing to a 'web of regulation' around government agencies (Hood and Scott 2000) having empirically discovered for the UK a rise in 'regulation inside government' (Hood et al. 1998). Light, in a study on the U.S. Congress-installed Inspector-Generals that oversee federal departments, notes 'an ever-increasing level of regulatory and reporting requirements on executive agencies and their employees' (Light 1993:17).

The implications of these pressures are two-fold. First, governments are expected to report on their activities to various audiences from expert regulators to the public and Parliament, from 'sleaze buster' and 'quality police' to 'waste watchers' (Hood et al. 1999b). Second, these growing reporting and transparency requirements imply an intensified blame game that is intricately linked to (failed) risk management (Hood 2002). Mirroring these implications there are two arguments in the literature that relate the rise of risk-based governance to these accountability pressures. The first argument highlights characteristics of risk instruments that make them suitable for accommodating the increasing demands for accountability. The second group of arguments focuses on those features of risk in governance that allow actors to cope with the repercussions of governance failure in a context of increased transparency and accountability (Rothstein, Huber and Gaskell 2006a). In general governance failures can be argued to be inevitable in view of the 'bounded rationality' (Simon 1957) in decision-making. In the context of increased transparency and accountability the likelihood of being detected and held accountable increases for the involved actors. Rothstein and colleagues therefore point to the increasing 'institutional risk' that actors responsible for risk management are exposed to. In this context institutional risks are:

> "risks to organisations (...) regulating and managing societal risks, and/or risks to the legitimacy of their associated rules and methods" (Rothstein, Huber and Gaskell 2006a:92).

In relation to the first argument risk instruments offer means to report performance and processes transparently and in a comparable way. This is because risk instruments quantify, standardise and – in some cases – monetise the potential harmful consequences (Ericson, Doyle and Barry 2003; O'Malley 2004). This allows for the measurement of the status quo and its actual reduction through measures as well as the definition of the desired outcome in terms of risk reduction.

Secondly, risk-based governance has been argued to enhance the capacity to manage 'institutional risk' and defend choices in an era of heightened accountability. A first set of 'risk-as-defence' arguments stresses the processes involved in risk-based governance and how they allow actors to defend and justify their choices. Scholars highlight the quantitative and scientific character that is associated with the use of risk instruments in governance. For instance Porter suggests that:

> "a decision made by the numbers (or explicit rules of some sort) has at least the appearance of being fair and impersonal. Scientific objectivity thus provides an answer to a moral demand for impartiality and fairness. Quantification is a way of making decisions without seeming to decide. Objectivity lends authority to official who have very little of their own" (1995:8).

This echoes an argument – bearing in mind the technical character of risk in governance – that has been made by Rose and Miller (1990) from a Foucauldian perspective in which they identify as 'technologies of government' knowledge and expertise. Knowledge has a key role in making aspects of existence thinkable and calculable and subject to deliberate and planned technocratic governance. Expertise in turn assigns social authority to specific forms of knowledge and judgement thereby shoring up the legitimacy of certain institutions and policy choices. Miller and Rose explain this authority as follows:

> "the language of expertise plays a key role here, its norms and values seeming compelling because of their claims to a disinterested truth, and the promise they offer of achieving desired results" (1990:10).

Another scholar, Michael Power, links the 'risk management of everything' (Power 2004) to his earlier arguments about the rise of the so-called 'audit society' (Power 1997). Auditing has spread beyond the private sector because its particular procedures offer legitimacy and blame deflection for organisations on the basis of 'ritualised practices of verification' (ibid.:14). Risk-based governance offers similar procedural reassurances as reflected in multi-step risk governance models – for example consisting of risk identification, assessment, management and communication (CEC 2002). Having risk-based management processes in place therefore accommodates widespread expectations that any potential dangers are manageable (regardless of whether this is true) and that an actor is responsible for their management, leading to what Power calls 'organised uncertainty' (2007).

A second set of 'risk-as-defence' arguments presents governance-by-risk as a means to defining risk management failure as a legitimate policy outcome, thereby defining the limits of governance. These arguments focus on the fact that risk is linked to uncertainty as a result of the 'bounded rationality' of decision-makers. If actors use risk instruments as an informational basis for governance, the fact that risk only provides the odds (not certainty) offers a justification should anything go wrong (Luhmann 1993; Rothstein, Huber and Gaskell 2006a).

Risk-based governance therefore also offers some compelling instruments to policy-makers and public risk managers to adapt to a political context characterised by increasing accountability and transparency. The drive for and adoption of more accountable and transparent governments appears to be a phenomenon affecting most advanced liberal democracies. This is illustrated by supranational policy initiatives of the European Union concerning 'good governance' and participation, commentary on an

emerging 'global civil society'[19] and enabling technological change such as access to the Internet with high household penetration rates[20] seem to underpin. However scholars have been cautious not to make universal statements about accountability and transparency pressures. One instance is the reflection of Hood and Scott on increased internal accountability pressures:

> "We lack any systematic cross-national survey of regulation in government, although parts of the field (notably audits and ombudsmen) have been comparatively mapped to some extent. So we cannot say with confidence which states have been most and least exposed to 'audit explosions' and new ages of inspection. We do not know whether the pattern observed (...) for the US (...) and for the UK (...) is observable in other cases or how far it constitutes an exceptional Anglo-American pattern" (2000:18).

Given these reservations it is of crucial importance to comparatively explore whether and how possibly varied accountability pressures have an important role to play in explaining the differences in risk-based governance in advanced, liberal democracies.

To sum up the discussion of risk in governance the actors involved in the management of risk live in a very dynamic, complex environment. Depending on scholarly perspective actors are embedded in a late modern 'risk society' facing confident, well-informed, risk-sensitive populations. They may also be situated in a neoliberal global economy in which they have to permanently view any governance activity against an economic, value-for-money yardstick. Finally actors may operate in a society that values and has the technological capacity to scrutinise any public intervention. These environments create strong incentives to adopt forms of risk-based governance. These drivers are not linked to (the rise of actual)

[19] The fact that there has been a Global Civil Society Yearbook (e.g. Anheier, Glasius et al. 2001) since 2001 (statistically) mapping and commenting on the emerging civil society is indicative of its existence.

[20] In 2009 the average figure for Internet access across the EU-27 is 65% with Greece (with 38% )having the lowest and the Netherlands (with 90%) the highest proportion of the population being connected (Eurostat 2009).

risk itself but pursue other objectives such as competitiveness or legitimacy. The incentives at first glance appear to be present in all advanced, capitalist liberal democracies. However many scholarly contributions are careful to point out that their arguments only apply under certain conditions or point to a lack of and need for cross-national research.

### 3.2 COMPARING RISK IN GOVERNANCE

This dissertation examines diversity in risk-based governance. To this end it undertakes a cross-country comparative study into risk-based flood management regimes in England and Germany. Ragin notes that:

> "comparative researchers (...) study diversity. (...) [They] tend to look for differences among their cases. Comparative researchers examine patterns of similarities and differences across cases and try to come to terms with their diversity" (1994:137).

This study of diversity is particularly relevant in a theoretical debate driven either by macro-level analysis of risk in governance (for instance Beck's *global* risk society or the *ubiquitous* spread of neoliberal forms of governance) or arguments based on single country studies (for example Power's 'audit explosion' and 'risk management of everything' draw mostly on UK examples; the 'insurance as governance' arguments by Ericson and colleagues focus primarily on Canada).

The recent scholarly interest in explaining a recent rise of risk-based governance across policy domains and in many countries sometimes hides the fact that risk assessments had attracted scholarly and policy attention as an important scientific input to setting regulatory standards for health and environmental risks for decades. This has particularly been the case since the 1980s as the U.S. National Research Council's so-called 'Red Book' guidance and the UK Royal Society report on risk assessment from 1983 show (NRC 1983; RS 1983). In this debate, risk assessments and regulations in different countries have actually been found often by commentators on the

politics of regulation to lead to different institutional and policy outcomes in different countries.

This is on the one hand testified by concrete conflicts in international politics. One instance is the BSE/mad cow crisis, when British beef was permitted for sale in Britain but banned for export into other EU member states. Similarly different risk regulations in the EU and the United States on growth hormones (the so-called bovine somatotropin) used in the production of milk and beef has resulted in a trade conflict between the two countries – with the EU taking a more precautionary stance and therefore restricting imports on the respective products from the United States. On the other hand scholars have also identified some puzzling differences in risk regulation. Vogel has taken an interest in transatlantic differences in regulating risk (1986; 2003). He observes that the EU regulations are now 'more risk averse or precautionary than in the US' (2003:25). Comparing two North American countries Schrader-Frechette (1991) discovered a mirror image in regulations of the United States and Canada concerning cyclamate and saccharin – with Canada permitting the former and banning the latter and the United States regulating in exactly the opposite way. Jasanoff's comprehensive study (2005) on different biotechnological innovations takes a broader interest than a focus on regulation and explores the varying roles and measures by governments, science and the public in response to the risks associated with biotechnology in the United States, Britain and Germany. In another comparative study she reveals the different regulatory treatment of carcinogens between Germany, Britain and the U.S. (Jasanoff 1986). For instance Germany's 'cancer' policy explicitly regulates the workplace risks associated with carcinogens whereby the carcinogenic potential of substances can also be established through animal experimentation. Britain in contrast does not have separate regulations concerning carcinogens per se, but any such risks are subsumed under the regulations for toxic substances. British officials are also reluctant to recognise any substance as carcinogenic unless there is corroborating human epidemiological evidence.

In view of the lack of systematic, comparative work in the context of recent debates on the rise of risk-based governance as well as accounts of diversity in the role of science in regulation in the 1980s it is important to undertake a comprehensive comparative study into new forms of risk-based governance.

## 3.3 A NEO-INSTITUTIONALIST PERSPECTIVE ON RISK-BASED GOVERNANCE

Beyond identifying diversity in the forms of risk-based governance this study aims at explaining the differences in governance themselves. The discussions on risk in governance provide some insights into possible drivers of risk-based governance. For instance risk in governance can be expected to be shaped by public opinion and pressure – whether driven by the greater reflexivity of the population (risk society, late modernity), the strong public response to major disasters (tombstones) or a more transparent risk management process (accountability). Another factor might be interest groups and their impact on policy-makers – inspired by the rise of public interest organisations (accountability), increasing economic interests in an expansion of markets and an efficient state (neoliberalism) and the emergence of an industry of risk professionals including insurers (the 'risk management of everything'; neoliberalism). These discussions point to traditional political science variables representing public risk managers as being exposed to public opinion pressures and the lobbying of interest groups – that is, the consequences of rational choices and preferences of individuals (in aggregate) and groups.

### 3.3.1 The advantages of and dimensions of neo-institutionalist explanations

This study however uses a different perspective, namely a neo-institutionalist perspective. Neo-institutionalist perspectives, varied as they are (Hall and Taylor 1996), in general challenge the idea that policy and organisational choices as well as social behaviour are solely the outcome of particular functional needs or individual and aggregated rational choice

(DiMaggio and Powell 1991). Institutionalists argue that such perspectives ignore that:

> "social, political and economic institutions have become larger, considerably more complex and resourceful, and prima facie more important to collective life" (March and Olsen 1984:734).

This perspective therefore highlights the role of institutional variables that shape individual preferences and collective choices concerning policies and the organisation of governance in a way that leads to outcomes distinct from those caused by market and power structures, functional requirements and aggregated individual choices.

Institutionalist accounts therefore offer an opportunity to challenge the accounts of the rise of risk-based governance as functional responses to more catastrophic risk, as reflecting the effects of market forces (and accommodating corporate interest groups) or as demands for greater transparency by public interest organisations and others. The complex landscape of social, political and economic institutions are expected to filter and shape the weights of these different needs and pressures in the consideration of responsible actors, the varied manner in which forms of risk governance accommodate these needs and to add further roles that risk instruments of different kinds may assume. An institutionalist account explaining the rise of the observed forms of risk-based governance from a comparative perspective challenges simple stories of 'rationalising' regulation and offers a richer account of actual risk governance. There are for instance institutionalist arguments concerned with the 'logic of appropriateness'– implying constraints through cultural and normative frameworks – to explain the selectivity in policy choices (March and Olsen 1984). Another argument points to the need of policy change to be compatible with core features of a state's administration (Knill and Lenschow 1998). Others highlight the 'path dependency' that constrains decision-makers even if the outcome may be suboptimal from a functional viewpoint: for instance existing institutional arrangements imply high

switching costs to novel policies (for example due to the high set-up and fixed costs) and create increasing returns (for example due to learning and co-ordination effects) (Krasner 1989; North 1990; Pierson 2000).

Institutionalist arguments also appear to be particularly interesting for comparative studies and the study of diversity. This is because broad similarity in public opinion and interest group responses would be expected under 'rational choice' assumptions given the similarity of challenges faced and of the emerging flood management programmes (e.g. anticipatory and adaptive, multi-domain management approaches). Moreover the actual effects of public opinion and various interest groups in governance can be argued to be filtered and shaped by institutions. The importance of such institutional filters was for instance highlighted by Lodge and Hood's examination of dangerous dogs risk regulation (Lodge and Hood 2002). While the authors acknowledge that public opinion and media frenzies have 'forced' the regulatory choices by policy-makers they also note that:

> "entrenched institutional obstacles shape the context of those choices by the interests and positions that are developed in advance of the crisis and being promoted before a crisis, and in the detailed way that regulatory tools and their application are developed during and after such events" (ibid:11).

Similarly in another comparative publication in which Hood and colleagues compare nine risk regulation regimes in the UK they observe – after examining the explanatory powers of market failure public opinion and interest group approaches – that they need to take into account the 'inner lives' of regimes, i.e. the 'politics of professional-technocratic interests in and around the state structures' (2004:140). In fact they note that:

> "the more we disaggregate regime content, the more we have to refer to the 'inner life' of the regulatory policy community" (ibid).

Once the authors move into this realm variables such as for example a 'common view'[21] of technocrats on radon risks and the human rights 'legal

[21] This seems close to the 'shared understanding' often referred to by neo-institutionalist scholars. See below.

framework' conflicting with populist demands (for instance, for a public registry of paedophiles) emerge as constraints on policy choices that reveal the limitations of approaches that present policy choices solely as an aggregation and balance of individual and interest group preferences.

The richness of neo-institutionalist explanations is partly a result of its openness to a wide range of constraining variables on choices of actors. Rather than focusing, like the early institutionalists, on formal state structures only, constraints reflecting specific more or less formalised norms and values, shared understandings and taken-for-granted beliefs are also being examined in more recent contributions to institutionalism (Hall and Taylor 1996; Scott 2008). Institutions therefore can be defined as:

> "comprised of regulative, normative and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life" (Scott 2008:48).

Extending more traditional institutionalist analysis with 'softer' variables and effective factors at different levels is particularly suitable for the analysis of risk-based governance. The reasons for this lie in the particular nature of the concept of risk. The concepts of risk and risk management have strong cognitive and moral connotations. Ewald (1991) for example notes that:

> "nothing is a risk in itself; there is no risk in reality. But, on the other hand, anything can be a risk" (ibid:199).

Forms of risk governance such as insurance are therefore examples of – in Ewald's view – a 'scheme of rationality' and 'a certain type of rationality' (ibid.) through which issues are objectified, quantified and thereby made governable (Rose 2002; Ericson, Doyle and Barry 2003). The particular risk-based schemes of rationality – among other things stressing quantitative measurability of possible events – may fit more or less with how actors make sense of the world. Furthermore Ericson and Doyle (2003) highlight the moral aspects of risk and its management. Rather than being neutral and instrumental the discourse surrounding risk is about moral

responsibility, accountability, retribution and justice. Risk implies the definition of values – of what society or particular groups value as good and bad – since it is defined as the product of probability and adverse consequences for something valued by somebody. Is this risk-based morality reconcilable with other moral principles of conduct and decision-making adopted by responsible actors?

Accordingly the analysis explores first, existing formal and informal rules that govern choices, practices and responsibilities that constitute the regulative dimension of institutional analysis. Actors within flood regimes are subject to hierarchical, legislative, constitutional and/or market-regulating rules. This is however complemented by 'softer' variables – reflecting the moral and cognitive connotations of risk and its governance. The analysis therefore also looks into the normative dimension of institutions – that is the norms and values held by and shaping decision-makers and principal actors. Norms imply prescription, evaluation and obligations whilst values define the desirable and preferred against which actions and processes are measured. In addition to this 'normative' dimension the following discussions take an interest in the so-called cultural-cognitive dimensions of institutions – that is the 'shared conceptions that constitute the nature of social reality and the frames through which meaning is made' (Scott 2008:57). Table 4 sums up the dimensions of institutional variables.

| **Dimension** | **Types of variables** |
|---|---|
| Regulative | Regulative rules (legislative, contractual and more) enforced through legal sanctions/coercion |
| Normative | Norms, creating social obligations and binding expectations |
| Cultural-cognitive | Shared understandings / taken-for-grantedness |

**Table 4: Types of institutional variables**

### 3.3.2 Comparative institutionalism, regulation and public policy-making

The idea of using an institutionalist perspective to explain variation in risk-based governance is not new. In fact the literature that has taken an interest in studying variety in the politics of regulation revolves around institutionalist explanatory variables.

In an early wave of scholarship commentators focused on state structures as explanatory factors (Evans et al. 1985). Most notably scholars identify national regulatory styles. For instance a European 'co-operative' regulatory style is contrasted with the 'confrontational' style in the United States (Vogel 1983; Badaracco 1985). Such institutionalist perspectives highlight for example the separation of powers between the Congress and the executive branch as a reason for greater rivalry and adversarialism in the U.S., as well as low barriers to litigation and judicial review that result in an emphasis on transparent, science-based, quantitative regulation of environmental and health risks. This style contrasts with the European one where regulators make decisions based on qualitative assessments and expert judgements reinforced by a wide co-ordination, trust and consensus among decision-makers in a less adversarial and transparent public sphere. These perspectives explore structures and relations within the government and the state – for example the relations between different parts of the state and political decision-makers and experts and how they shape the instrumental choices of regulators, administrators and policy-makers.

More recent accounts move beyond such 'harder' and visible factors and explore cultural and normative variables. An early formulation of the importance of 'culture' in determining which risks to pay attention to and in what ways to manage them can be found in Douglas and Wildavsky (1982). The authors distinguish between four different types of worldviews (egalitarian, fatalist, liberal and hierarchist) that can prevail in societies. Originally cultural theory has often been applied to explain and predict varying risk perceptions in different cultural contexts (Drake and Wildavsky

1990; Sjoberg 1996). More recently scholars have also sought to apply cultural theory to explaining public policy responses (Lodge et al. 2008). The starting point is that each of these worldviews is connected to different understandings of the nature of the world, distinctly organised social relations and underlying cause-effect relations. This in turn leads to different problem definitions and policy solutions depending on which of the competing worldviews has come to dominate a particular regulatory regime. Variance in the choice of particular policy instruments can therefore be examined through the lens of different worldviews that dominate in regulatory regimes.

Jasanoff (2005), in her comparison of regulatory and epistemological foundations of risk management concerning biotechnology in the United States, Germany and Britain, explores the concept of distinct political cultures as an explanatory variable. The political cultures shape policy choices and assign meaning, legitimacy and identities to types of expertise and actors. For instance the Anglo-Saxon countries' pragmatism and utilitarianism contrasts with Germany's deontological ethics, leading to different regulatory outcomes concerning the treatment of embryos or genetic engineering. Choosing the wider concept of 'political cultures' Jasanoff's analysis takes into account a wider set of institutional variables than state structures alone.

In short an institutionalist perspective on the rise of forms of risk-based governance promises to challenge existing accounts of the rise of risk-based governance and to replace them with richer explanations of the particular configuration of risk-based governance that results from the interplay of different types of institutional constraints and opportunities. Moreover an institutionalist perspective allows for a more comprehensive view on traditional political science explanations – such as public opinion and interest groups as variables that shape particular policy and organisational choices because the impact of such factors on governance can be argued to be filtered by the institutional context.

## 3.4 CONCLUSIONS

This chapter provided a review of the scholarly literature on risk in governance. It has demonstrated that beyond their particular functional rationality within more anticipatory and adaptive flood management regimes (see chapter 2), there are a number of arguments that seek to explain the rise of risk-based governance.

These arguments include indirect explanations – such as those that discuss the growing pressure to undertake governance of risk – for which risk instruments may be relevant. Other arguments directly address the rise of governance-by-risk as a response to pressures on the state and society to become more competitive, economically rational and market-oriented as well as pressures on the state to become more accountable. In this context the concept of risk and associated instruments matter for their quantitative, numerical and scientific qualities as well as their statistical-probabilistic and potentially monetary character.

While the arguments about risk in governance shed light on important trends in risk governance and its context they often remain at a macroscopic level or fail to examine whether the same arguments apply to the same extent in different countries and policy domains. As some of the comparative literature focused on the politics of regulation and the role of science in regulation indicate however, risks can be governed in very different ways with the input of risk instruments being used to very different ends. It is to enrich existing accounts on the rise of risk-based governance and to expand on existing comparative work, that this study into the rise of risk-based flood management in different countries has been undertaken.

This research takes a special interest in how institutional variables – from formal rules to shared understandings – shape the particular configurations of risk in governance in different countries. Are the emerging risk-based flood management regimes in place to better manage floods – in terms of reducing the risk in a more cost-effective and accountable manner?

Does this apply across countries and regimes? Which objective is prioritised, cost-effectiveness, accountability or safety? What are the reasons for these prioritisations and possible differences? Are there further considerations that shape the use of risk in governance? These are the questions for which answers are sought within this research.

# CHAPTER 4: COMPARING RISK IN GOVERNANCE. ANALYTICAL FRAMEWORK AND RESEARCH DESIGN

Comparing the management of flooding in different countries is a challenging task. Floods are managed through a complex array of interventions: from the clearing of debris near bridges, issuing regulations prohibiting the sealing of surfaces in front yards or encouraging particular forms of farming and co-ordinating between meteorological services and flood forecasters to offering insurance policies covering flood damage to home contents. Actors of private and public nature, from local to EU levels and in a large number of policy domains are involved in different aspects of flood damage prevention. At the same time focusing on risk-based governance also offers a challenge of notable complexity, with the different forms in which risk assessments can come and their manifold uses in flood management. These challenges imply a rich empirical case in the context of which the variety in risk-based governance in different institutional environments can be examined. At the same time they highlight the need for a comprehensive and concise comparative research design.

To meet this need this chapter introduces the risk regulation regime framework developed by Hood and colleagues (2004). As the discussion in this chapter demonstrates the approach is comprehensive in its use and definition of the concept of regime; it is also concise thanks to the fact that the regimes can be disaggregated into functional and sectoral components. In addition to introducing the framework further sections explain the selection of the case and the methods and data used.

## 4.1 COMPARING RISK REGULATION REGIMES

Using the risk regulation regime approach as a framework for comparison allows for a comprehensive and nuanced examination of the role of risk instruments in the varied endeavours of actors involved in flood management to prevent, control and reduce the harmful consequences of flooding. More specifically it is the concept of regimes that helps us to go

beyond a simple analysis of (for instance) command-and-control regulations (such as a ban on land use near the river bank) and to recognise the multitude of mechanisms through which control is organised and exercised and in which risk instruments can matter in manifold ways. In addition regimes can – following Hood and colleagues' approach (2004) – be disaggregated into functional components, adding another filter through which the impact of risk on governance can be located more precisely. The following sections set out the comparative framework.

### 4.1.1 Risk regulation regimes

Regimes denote the 'complex of institutional geography, rules, practice, and animating ideas' (Hood, Rothstein et al. 2004:9) that are associated with the control of a particular adverse event and its consequences. The regime concept by Hood and colleagues is, in contrast with the more traditional political science focus on 'government' and formal processes, open towards informal control mechanisms and non-state agency. This appears important for the case of (risk-based) flood management in particular and risk governance in general. For instance non-state actors such as insurers can be important for managing the consequences of flooding as well as in relation to arguments about the emergence of neoliberal risk regimes. Informal mechanisms that contribute to and organise the control of flooding – such as ideas about the appropriate role of the state in flood management – can be important in order to inform the actors (for instance non-state actors and individuals in the case of a limited state involvement) of the existing risks and their responsibilities as well as for putting in place the appropriate set of (support) measures (e.g. subsidies for low income households to be able to buy insurance products).

In addition to this comprehensiveness of the regime concept it is also analytically useful for drawing the boundaries of the research object, especially for a complex governance challenge such as flooding. A regime's components are identifiable through their objective to control the particular

threat of future flooding. This focus on varied mechanisms of control allows for a study of the concrete impact of risk instruments on each of the components of a specific country's risk regulation regime in contrast to grand narratives on risk governance such as Beck's 'risk society'. One example of overly generalising arguments of such grand narratives is Beck's treatment of risk-based insurance. In it he assumes that insurance fails and consequently withdraws cover for the novel risks in a risk society because the complexity and scale of the novel risks render existing capacities for risk assessments and capital formation inadequate. However as Ericson and Doyle argue this is because:

> "Beck, as well as other participants in debates about risk society, makes his assertions about insurability without empirical evidence regarding how the insurance industry actually operates in conditions of uncertainty" (2004b:139).

The use of the regime framework will provide a detailed overview of how and to what extent risk instruments are used for different aspects of managing flooding in different countries. The regime approach is further elaborated by Hood and his colleagues (2004) by identifying three different functional dimensions of regimes as will be discussed in the following section.

### 4.1.2 Disaggregating risk regulation regimes: The functional dimensions

Hood and colleagues (2004) disaggregate the regimes on the basis of categories of cybernetic control systems (Dunsire 1991). Three functions are identified namely directing, detecting and effecting.[22] These components reflect traditional terms of political analysis such as policy formulation/adoption, problem identification/policy evaluation as well as

[22] In fact the authors (2004) use in their monograph the functions of information-gathering, standard-setting and behaviour-modification. In earlier papers (Hood, Rothstein et al. 1999; Hood and Rothstein 2001) directing, effecting and detecting are being used. This thesis uses the latter because the term 'behaviour-modification' implies mainly organisational and individual behaviour whilst 'effecting' is more easily being understood as a more comprehensive term open to include modification of natural processes. This latter aspect is of relevance in the management of environmental disasters such as flooding.

enforcement/implementation respectively. In line with cybernetics these three functions are necessary for a system to exercise control as the following discussion will show.

'Directing' is about having a clear knowledge of the preferred state of the world one seeks to achieve. This implies the setting of goals, targets, guidelines and standards that provide direction to the agents within the regime. Such standards may include for example goals such as lowering the numbers of road accident victims or particular emissions standards for nitrates from agriculture to protect water bodies. This goal and standard-setting has always received substantial attention in the debate of risk regulation because it raises controversial issues about the equality of safety standards for all and hence ultimately the value of life, as well as the level of tolerable risk and the distribution of risk (Heimann 1997). Whilst these discussions focus on the nature of the standards and goals involved, scholars have also directed their attention to the underlying processes of standard- and goal-setting. Dunsire (1990) for instance distinguishes between simple steering, homeostatic control and control through opposed maximisers ('collibration'). Simple steering is based on targets set through administrative decisions directly based on available risk analysis. Homeostatic control introduces certain quantitative or qualitative levels of acceptable risk that are to be kept without regard for competing objectives or interests. In contrast 'collibration' generates regime standards through a deliberative process which allows the weighing of different criteria against one another (e.g. risk-benefit-comparisons, risk-risk-trade-offs). Studying variety in risk-based governance this research focuses on the extent to which and how standards and goals of safety and risk reduction are defined in probabilistic and risk terms in the two countries, what alternative considerations are reflected in the goals and – if the countries vary in extent and manner of risk-based directing – how this can be explained.

'Detecting' refers to ways through which the system receives information about the state of the world. This means that information is

gathered to produce knowledge on the risk in question and to monitor the accomplishment of goals and compliance with standards. Examples include registering dangerous dogs and measuring the contamination of food with pesticides. Information about a particular threat can however come in different ways, exhibit varying quality and be collected by different actors. Potential dangers can be estimated through different means – from rule-of-thumb assessments to sophisticated, statistical risk assessments (O'Malley 2004). Moreover Hood and colleagues (2004) suggest that the (quality of) risk information can be contestable. These suggestions reflect the wider debates on the co-production of knowledge (Jasanoff 2004) and the indeterminate character and local nature of scientific knowledge generation (Wynne 1996), which casts doubt upon the quality of even supposedly objective and superior nature of scientific information. Apart from the nature of risk information, information-gathering can be undertaken by various actors – from the government agency to individual insurers to commercial risk modellers – using multiple sources of data. This regime dimension is in view of the informational character of risk instruments of central importance to forms of risk-based governance and the variation in the type of information gathered (e.g. information on spatial, environmental, monetary consequences) and the actors involved provide important insights into the extent of and the varied ways in which decision-making in flood management can be based on calculations of risk.

'Effecting' addresses the discrepancy between the desired state of the world and the observed one. It refers to measures taken to achieve human behaviour modification and hazard impact mitigation that are needed to achieve the goals. Examples may include inspections of retailers concerning the compliance with certain pesticide standards or awareness-raising campaigns for road safety. Effectively accomplishing behaviour modification and hazard impact mitigation is problematic. In terms of behaviour modification it might be difficult to accomplish its objectives in view of counterproductive preferences and incentives of the regulating

bureaucrats and the regulatees. Even if bureaucrats are willing to accomplish behaviour modification this may in turn contradict the rationale of the overall risk control goals, as illustrated by concepts such as 'goal displacement' (in other words rules in place to achieve an end become an end in themselves) (Merton et al. 1952) or 'tunnel vision' (implying single-minded and disproportionate regulation) (Breyer 1993). Whilst this discussion shows that behaviour modification may be problematic Hood and colleagues (2004) point to different approaches to achieve it. They distinguish between 'compliance' and 'deterrence' mechanisms. The former relies on diplomacy, persuasion or education; the latter stresses sanctions and expected costs of violation to change behaviour. In addition to controlling human behaviour the control of natural processes and their impact also emerges as a major challenge – as the previously mentioned experiences of the failure of technical control over floods in the 1990s and 2000s illustrate. This study's discussion on risk-based governance takes an interest in the various aspects of effecting – with risk instruments being expected to improve the effectiveness and cost-efficiency of risk management and offering non-state, 'compliance-style' effecting mechanisms. To what extent and how do risk calculations shape effecting' efforts?

The discussion of regime functions in relation to risk-based governance is summarised in the following table 5. The first column sums up the purpose of the three regime functions. The second column rephrases in the form of questions earlier discussions on how the different dimensions might be looking like from a risk-based governance perspective. In a nutshell, the questions concern the extent to which and the way in which a quantitative, probabilistic and economic (risk-based) logic informs and is reflected in the decision-making and measures by flood regime actors in each of the three regime functions.

| | Purpose | Questions relevant to risk-based governance |
|---|---|---|
| **Directing** | Determining the preferred state of the world through setting certain goals and standards | Are the standards/goals defined in terms of risk? If so how (e.g. including consequences or just probabilities)? What alternative logic/considerations to risk are reflected in goals? |
| **Detecting** | Assessing the current state of the world and monitoring progress towards goals/standards | What kind of risk information is collected? Which actors are engaged in this? |
| **Effecting** | Undertaking measures that achieve the goals and standards | To what extent is 'effecting' organised through risk (e.g. the greater the risk the more aggressive the interventions)? |

**Table 5: Risk regulation regimes and regime functions**

This functional disaggregation allows for a more nuanced analysis of how risk instruments affect different stages/functions of the governance of risk. Disaggregating regimes in this way can reveal important control problems that would remain hidden in other perspectives. One illustration is the discrepancy in control between 'effecting' and 'directing': Particular regulations or safety guidance are not being applied because the target groups do not understand the regulations (e.g. Wynne 1989), or the regulator – whether deliberately or not – does not provide sufficient resources for the implementation (e.g. WHO 1990).

However emerging approaches to flood management – with their diverse range of interventions – also need to be organised into different categories, namely by particular policy domains or sub-regimes, in order to gain a more concise understanding of how in different domain contexts actors adopt varied risk-based forms of governance. This disaggregation will be discussed in the following section.

### 4.1.3 Disaggregating flood management: Three policy domains

The emerging approach to flood management has been shown to have moved away from an approach that primarily relied on flood defences and other engineered infrastructure (such as river straightening) to a more holistic approach. The holistic approach includes measures from policy domains such as environmental conservation, agriculture, spatial planning, construction, transport, water management and industrial development.

This thesis focuses on three policy domains only – namely land-use planning, flood defence infrastructure and the financing of disaster damage. There are three reasons for this selection. First, each of the three regime domains allow for an examination of a particular convergence argument. More specifically all three domains can be linked to arguments about the effectiveness of the state as a risk manager. As argued in chapter 3 advocates of neoliberalism take issue with the state's wasteful use of taxpayer money and promote market-based solutions for risk management. Moreover a critical view on the 'regulatory state' highlights the costs of regulation. The regime domain of flood defences implies significant public investment into safety infrastructure. Disaster financing may be provided by the commercial insurance industry. Finally land-use regulation may include the establishment of formal rules that restrict the use of land at risk from flooding that is often associated with significant economic benefits. In each of the three domains an argument in support of a particular form of risk-based governance can be made and examined from a comparative perspective.

Second, the regime domains are very distinctive in terms of government tools and actor constellation. Flood defences are as noted using the tool 'treasure' (basically the use of money) (Hood 1983) to achieve flood management objectives. The domain is usually dominated by water management authorities such as water authorities and environment agencies. Land-use regulation uses the tool of formal rules (or legal 'authority' in

Hood's government toolkit (1983)) to pursue its flood management goals. The central actors are normally expected to be planning authorities and ministries. Disaster financing also makes use of financial resources and regulations but may work through economic incentives (and not – as in the case of governmental regulation – coercive powers) to achieve risk management objectives. The central actors primarily consist of insurance companies and finance ministries.

Third, each of the regime domains plays a central role within flood management and the emerging risk regulation regimes. Flood defences are protecting significant existing values from flooding. Land-use regulation is an effective means to reducing the (growth of) damage potential. Disaster financing is crucial in dealing with the increasing losses from flooding.

A more extensive description of these policy domains and how they have been organised specifically in Germany and England follows in chapter 5 through 7 (with its domain-by-domain descriptions of the flood regimes). These domain-by-domain discussions will show that the composition and relations of actors as well as the goals of different actors is more complex than presented in this short discussion.

Taking these two disaggregations together a comprehensive and differentiating analytical framework to analyse different countries' flood regimes can be devised. This is illustrated in table 6.

| | Policy domains | | | |
|---|---|---|---|---|
| **Regime functions** | | **Flood defences and water management infrastructure** | **Land-use regulation and planning** | **Financing of disaster damage** |
| | **Detecting** | | | |
| | **Directing** | | | |
| | **Effecting** | | | |

**Table 6: The analytical framework: flood regimes disaggregated**

The next section elaborates which data has been collected to complete this table.

## 4.2 CASE STUDY DESIGN, COUNTRY CASES AND QUALITATIVE METHODS

The analytical framework (multi-dimensional regimes) highlights the complexity of the object of analysis while the research questions (in what ways does risk-based governance vary and how can this variance be explained?) point to the exploratory character of this study. This complexity and exploratory character leads to a case-oriented qualitative research project, more specifically, a two-country case comparison using qualitative methods to collect empirical data. The following sections explain these research design choices.

### 4.2.1 Small-n case study design

This study focuses on studying the complex flood regimes in two countries, each comprising three subregimes/policy domains each. Such small-n designs with two case studies allow for more intensive examinations of the factors that shape particular policy choices (Gerring 2004). This is particularly relevant for complex analytical objects such as emerging flood regimes and risk instruments of varying shapes and in different roles. Yin argues that a specific advantage is endowed upon the case study method when:

> "a 'how' or 'why' question is being asked about a contemporary set of events, over which the investigator has little or no control" (1989:20).

Moreover case studies are unique in terms of depth and richness of data. This allows for the discovery of causal mechanisms and complex variables. These aspects are particularly important to understanding how particular institutional constraints shape the choices of actors concerning the design, selection and application of policy instruments. Another reason for the limited number of cases is the time and resource constraints of a doctoral research project.

### 4.2.2 Selecting country cases: Germany and England

This research examines the cases of Germany and England. The actual choice of particular country cases reflects the need in comparative research designs to create a coherent set of cases, delineated from others by empirically and theoretically defined categories. As this research focuses on identifying variation in risk-based governance it is necessary to identify countries that are similar in respect to the presence of the assumed 'drivers' of risk-based governance, but offer variations with regards to aspects of risk-based governance and institutional settings. This latter variation is to be used to identify causal conditions that can be linked to divergent outcomes in interpretable ways (Ragin 1994). While the actual variance in the risk-based governance of flooding is part of what this study is actually exploring, the countries are selected in a way that ensures that the prerequisites for risk-based governance for flooding are being given. At the same time they should show a strong variation in their respective institutions in order to understand whether and how different institutions shape risk-based governance.

In fact the cases show significant similarities in terms of policy challenge and responses in particular, but vary substantially in terms of institutional settings. The cases therefore allow for a most-similar cases design. As Peters notes:

> "the most similar systems design has been argued to be *the* comparative design, given that it is the design that attempts to manipulate the independent variables through case selection and to control extraneous variance by the same means" (1998:40).

Germany and England offer suitable cases for the analysis of institutional variables shaping risk-based governance. For both countries there are strong reasons (based on the convergence arguments introduced in chapter 3) to believe that risk-based flood management of a similar form is widely adopted. First, they are among the most severely affected countries in Europe throughout the 1990s and 2000s. These disasters have increased the pressures for reviewing the flood management approach and opened 'windows of opportunity' (Kingdon 1984) for the introduction of a new approach to flood management.

Second, making use of these opportunities policy-makers and flood managers in the two countries overhauled each country's approach to flood management in the aftermath of flood events (in 1993 and 1995 in Germany and 1998 and 2000 in England). The new approach – as presented in chapter 2 – is anticipatory and adaptive and assigns a special role to risk instruments and information. The endorsement of risk instruments by key actors in both countries is further underpinned by their involvement in and agreement to the risk-oriented EU Flood Directive. Moreover the importance of risk in governance more generally is also underlined by broader policy and institutional changes in the two countries. Both countries have developed centralised comprehensive explicitly risk-oriented tools and management institutions – such as the UK Cabinet Offices' 'National Risk Register' (Cabinet-Office 2010) or Germany's establishment of the Federal Institute of Risk Assessment (BfR; *Bundesamt für Risikobewertung*) and the Federal Office of Civil Protection and Disaster Assistance[23] (BBK; *Bundesamt für Bevölkerungsschutz und Katastrophenhilfe*) in 2002 and 2004 respectively.

[23] The BBK calls risk assessment the 'central basis' for civil protection and 'core component' to its risk management (BBK 2010:3).

Third, the two countries – as advanced liberal democracies embedded in the global economy and members to the European Union – are also subject to pressure to 'modernise' their public sector and services as well as the relations between state, market and society. Both countries are deeply embedded in the competitive European and global economies. The importance of competitiveness considerations had become particularly prominent in Germany in the mid-1990s in debates about the '*Wirtschaftsstandort Deutschland*' (investment/industrial location Germany) when environmental regulations were challenged on the grounds that they undermined Germany's economic performance in comparison to competing nations (Weidner 1995). For Britain, Moran notes:

> "Mrs Thatcher's and Mr Blair's lectures to foreigners on the need to adapt to global markets reflected the belief that Britain (...) now had the providential mission of leading into the new world of globalization" (Moran 2003:160).

In both cases the adaptation to a globalised competitive economy also implied a modernisation of regulations and state interventions in a manner that would allow countries to compete within the global economy – examples being the 'light-touch' regulation of financial markets in the UK and welfare reforms (the so-called 'Hartz' reforms) in Germany. In addition both countries have formally subscribed to private commercial insurance systems to provide compensation for flood damage in contrast to many other European countries (Prettenthaler and Vetters 2004).

Moreover in both countries, mechanisms to increase pressure for greater accountability are in place with an active media landscape, a wide penetration of the Internet[24] as well as strong and well-established social movements and civil society organisations. Also both countries have endorsed the EU's 'good governance' agenda, are signatories to the Aarhus

[24] The figures on the proportion of households with access to Internet for Germany and the UK are 79% and 77% respectively (Eurostat 2009).

convention on freedom of access to environmental information and have adopted Freedom of Information Acts (Britain in 2000, Germany in 2005).

These aspects of the two country cases suggest that the emerging flood regimes can be expected to assign a substantial role for risk instruments. Moreover the close co-operation of experts and authorities across national boundaries – for instance for the preparation of the EU Flood Directive or in circles such as EXCIMAP – points to expert information exchange and consensus that increases pressures for policy convergence implying the emergence of similar forms of risk-based governance.

The presence of these drivers which make it worthwhile to study these cases to examine risk-based governance cannot be taken for granted. Other countries within the same spatial context (Europe) display lesser degrees of similarities in respect of these important dimensions. In Southern Europe flooding is much less of a current and prospective problem (EC 2008). Eastern and central Europe experienced major flood events (in fact, Poland and the Czech Republic also suffered from the summer 2002 floods of Elbe and Danube). However they only entered the EU in 2004 and have a much shorter record of belonging to the group of liberal democratic capitalist countries as compared to Britain and Germany. Finally, western European neighbours such as France or the Netherlands rely on state-organised disaster compensation schemes rather than subscribing to market solutions – an aspect relevant in the context of the 'neoliberal' driver of risk-based governance.

At the same time this study is interested in diversity. More specifically it explores how institutional variables shape the role of risk instruments in flood regimes. In this relation the two countries offer substantial variance. This variance is concerned with the structure of the polity: Britain is normally classified as a simple polity, a unitary, centralised state. While this has changed since the 1999 devolution the flood management of England is integrated into the centralised political system

normally described as being dominated by Westminster (the UK Parliament) and Whitehall (the UK executive). Germany on the contrary is defined as a compound polity, a fragmented, Federal state with a large number of institutional veto points (Katzenstein 1987; Schmidt 2005). Fundamental political processes are also organised distinctly in the two countries with Britain being classified as a majoritarian and Germany a consensual system (Lijphart 1984). Moreover a strong contrast between the two cases has also been found for the political economy. Here Britain has been classified as a liberal market economy (LME) and Germany's political economy has been termed as Rhenish capitalism or a coordinated market economy (CME) (Albert 1983; Hall and Soskice 2001). The two types contrast in the role of states and markets, with competition and arm's length relations between actors in the political economy prevailing in LME and non-market, strategic and co-ordinated relations being significant in CMEs.

The distinct models and patterns describe generic differences in the institutional settings of Germany and England. Their impact and that of further institutional variables on risk-based governance is an empirical question that will be resolved in the course of this study.[25] It is reasonable to expect that these variables matter. On the one hand many of them – including the number of veto points in Federal versus centralised polities and the concentration of executive power in majoritarian systems – have for instance been argued to shape other aspects of environmental policies in the two countries (Knill and Lenschow 1998). On the other hand they can be related to some of the suggested drivers of risk-based governance, for instance the complexity of agency in compound compared to simple polities is likely to affect accountability mechanisms and pressures. The weight of non-market actors and mechanisms in co-ordinated market economies

[25] An extensive discussion of relevant institutional factors will be undertaken in chapter 8. This discussion will also show how the generic descriptions of polities and political economies may only provide a starting point for an institutionalist analysis. Ideas like particular institutionally-determined 'types of capitalism' have been contested (for instance, Hancke 2009).

compared with liberal market economies may affect the effects of the pressures of neoliberalism on actors in the two countries.

Germany and England – with their combination of similarities (policy challenge of flooding; policy shift; broad presence of drivers of risk-based governance) and dissimilarities (institutional characteristic of political system and political economy) –therefore constitute cases suitable for a comparative examination that focuses on institutionalist explanations of diversity in risk-based flood management.

While England is strictly speaking not a country and only one part of the United Kingdom, the devolution under New Labour in 1999 implied that flood management fell under the exclusive remit of the devolved territorial administrations of Scotland, Northern Ireland, Wales and England. This study focuses on England because of the continuing strong institutional contrasts with Germany resulting from the fact that the same institutions in charge for Britain before 1999 remained responsible for England's flood management. Moreover the most devastating flood events in Britain –most notably the floods in 1998, 2000 and 2007– predominantly affected England.

### 4.2.3 Qualitative methods: Interviews and document analysis

The arguments and observations made in this thesis draw on data collected through qualitative methods. This is due to the need to understand the causal relations and mechanisms that shape the organisational and instrumental choices of decision-makers within flood regimes. Qualitative methods generate rich empirical data that reveal the underlying motivations, perceived constraints and attitudes of decision-makers.

Two methods are selected, namely document analysis and semi-structured elite interviews. The analysis of documents is in general perceived to be useful for providing an understanding of the context of the research topic (Weimer and Vining 2004). Reflecting this function documents provide insights into the nature and future prospects of flooding and flood risk, different types of costs/damage floods can cause, the interactions

between climate change, precipitation and flooding etc. Such reports are often authored by scientific institutions, independent public bodies or various societal interests. Examples for such reports include the Future Flooding report by the UK government's Office for Science and Technology (Foresight and OST 2004) the LAWA paper on climate change and water management (LAWA 2007) and the commentary by the insurance industry on flood risk and climate change (ABI 2004a).

Beyond providing background information documents can provide information on the organisation and the principles and performance of the governance process itself. In particular, the key documents, such as government strategy documents and legislation itself as well as agreements with binding character that introduce and reproduce the measures, regulations and responsibilities within the flood regime, were examined for the (linguistic) use of risk in governance documents and the reference to instruments and concepts that draw on quantitative and probabilistic calculations (e.g. the reference to benefit-cost ratio does not explicitly include the term of 'risk' but draws on calculations of avoided probable damage to define the benefits of a governance intervention). Examples for documents of particular relevance to this end are the Federal Flood Control Act (HWSG) in Germany (*Gesetz zur Verbesserung des vorbeugenden Hochwasserschutz*, i.e. the Act for the Improvement of Precautionary Flood Management) (Bundesregierung 2005b) the UK Environment Agency's flood risk management strategy 2003-2008 (EA 2003) and the UK insurance industry's statement of principles on flood insurance (ABI and Government 2008).

A third set of documents comments on, reviews and evaluates the risk management mechanisms, performance, objectives, legal norms and principles in place at different times, provide information about institutional configurations, binding and non-binding rules and practices and ideas. Among the authors of such documents are responsible government departments and agencies as well as other public bodies such as

parliamentary actors. Examples are the lessons learned reports in the wake of various disasters (Bye and Horner 1998; EA 2001; von Kirchbach 2002; DKKV 2003; EA 2007; Pitt 2008) but also guidelines for the interpretation of policy strategies by the responsible government department/agencies itself (DCLG 2007c; ARGEBAU 2008). In general the document analysis has been undertaken cautiously, showing awareness for distorting factors such as the document's age, specific purpose, limited substance, as well as the authors' biases and tendencies for blame shifting/avoidance.

The mostly descriptive insights provided by documents are complemented by a series of semi-structured elite interviews undertaken between April 2008 and August 2009 in the two countries. Interviews disclose the motives and attitudes/personal realities of decision-makers, the risk interpretations that explain their actions and the constraints under which they operate. They are therefore crucial to understanding agency, choices within flood regimes and the impact of the institutional context on actors. In addition interviews can complement those 'descriptive' pieces of information on (for example) the institutional architecture that the document analysis was not able to deliver.

The approach to the selection of interviewees is driven by the analytical framework. First, interviews are guided by the regimes' institutional infrastructure that in turn reflects the policy domain and functional dimensions of the concept of regimes. Therefore representatives of actors/institutions involved in the policy domains of flood defence, land-use regulation and disaster financing with functional responsibilities for 'detecting', 'directing' and 'effecting' were interviewed. Secondly, flood management is multi-scalar; floods are phenomena that affect some regions more than others and flood management takes place on European, national, regional and local levels. Interviews therefore included actors from different government levels. In addition a number of stakeholders such as insurers and public interest organisations were interviewed.

The following table 7 provides an overview of the interviews undertaken[26] how they covered different policy domains as well as agency in and on different levels of governance.

[26] A list of interviews is provided in the Appendix.

| | GERMANY | BRITAIN | Total |
|---|---|---|---|
| **POLICY DOMAINS** | Number of interviews | | |
| Flood defence and water management infrastructure | 15 | 10 | **25** |
| Land-use regulation | 17 | 10 | **27** |
| Disaster financing | 12 | 9 | **21** |
| **Total number of interviews (Total numbers of persons)**[27] | **44 (29)** | **29 (18)** | **73 (47)** |
| **ACTOR TYPE** | Number of interviews | | |
| **Government / state** | **21** | **11** | **32** |
| Local | 2 | 1 | 3 |
| Regional/Länder | 10 | 2 | 12 |
| National | 9 | 8 | 17 |
| **Non-state** | **8** | **7** | **15** |
| Insurer | 6 | 5 | 11 |
| Other stakeholders | 2 | 2 | 4 |
| **Total number of interviews (Total numbers of persons)** | **29 (29)** | **18 (18)** | **47 (47)** |
| EU | | 1 | 1 |

**Table 7: Interviews by category**

[27] Many actors are involved in more than one of the policy domains. For instance interviewees from Germany's LAWA developed guidance covering all aspects of flood management (LAWA 1995; 2004) while Defra officials engaged with the insurers but also worked on land-use control issues as well as flood defence management. This has led the double-counting because a single interview provided data for more than one policy domain.

The selection of regional and local sites is driven by this research's interest in the ways in which the emerging flood regimes adopt risk instruments. The emergence and change within the flood regimes can be expected to be most pertinent in the most affected areas of Britain and Germany – in line with arguments about policy change that result from major disasters (Kingdon 1984; Baumgartner and Jones 1993). Consequently this dissertation used data from England's Thames and South Holland regions that were affected by major flood events since 1998. In Germany Saxony (affected by watershed event of 2002) and North Rhine-Westphalia (affected by initial trigger flood events of 1993 and 1995) were chosen as areas affected by major flood events.

Moreover in North Rhine-Westphalia in particular the flood management of the Rhine – most notably the pioneering work by the International Commission for the Protection of the Rhine (ICPR) – is also a key site that provides insights into the emerging risk-based flood management because it pioneered and applied many aspects of the more anticipatory and adaptive approach to flood management. In fact instruments such as the flood risk map 'Rhine-Atlas' (by the ICPR) served as a model for other river catchments and Länder.[28] While Saxony's efforts at flood management were only really stepped up after the 2002 floods the floods were such a major disaster that policy-makers had a major opportunity to overhaul their approach, aided by substantial material and expert resources that were mobilised after the disaster. The influential role of Saxony's flood management is noted by a flood expert in Saxony's ministry of environment:

> "Sometimes, other states are a bit irritated because Saxony has progressed so quickly. In Germany, you always have this situation that one state looks what the other one has been doing. Our work is acknowledged by the relevant experts in different states. [All] this was

[28] For instance similar flood risk maps and stock-taking exercises were undertaken by river commissions at the Elbe (ICPE 2001; ELLA 2006). As an expert in Saxony's Ministry of Environment points out, "the Rhine-Atlas was the template but ours is much further developed" (SMUL 2008, interview).

> possible thanks to the resources that were made available to us but not to others. (...) Now the colleagues from North Rhine-Westphalia told me that they want to do it the same way as Saxony. (...) And as we have benefited from Germany's solidarity, we return the favour. Therefore, we make all our know-how and expertise freely available to all those interested. So that, for example, we have provided Bavaria and Baden-Wurttemberg with all the documents, from tender documents to maps" (SMUL 2008, interview).

Studying NRW therefore offers an insight into how risk instruments have been designed and used in a case from the early phase of the policy shift towards a more anticipatory and adaptive regime in Germany that influenced subsequent activities in other Länder. Examining Saxony points to a context in which substantial resources were made available to overhaul flood management comprehensively and systematically and at a stage when the novel anticipatory and adaptive approach had become well-established (e.g. through LAWA guidelines from 1995, the Rhine Flood Action Plan from 1998 and revised Federal Water Management (1996) and Spatial Planning Acts (1998)). The flood management of Saxony became – thanks to the systematic and comprehensive work undertaken on a well-resourced basis – a point of orientation for other Länder. The data for the two Länder is combined with the empirical data from the 'framework' providing Federal level influential intra-governmental co-ordination bodies such as the Working Group Water (LAWA) of Länder and Federal government and where feasible within the resource constraints of the present work from further Länder.[29] This data therefore mostly provides an insight into how risk matters in flood management in Germany under conducive conditions (well-resourced) with substantial impact on other Länder (the 'pioneering'/benchmark character) and where an inter-Länder and Federal consensus and convergence has emerged (nation-wide Federal Law; consensual guidelines by inter-Länder bodies such as LAWA). Bearing in

[29] References are for example being made to Sachsen-Anhalt, Rhineland-Palatine, Brandenburg and Bavaria. All of these Lander have experienced flooding in the 1990s and 2000s.

mind the Federal fragmentation and geographical diversity of Germany this variety of data sources is to be seen as an attempt to providing a comprehensive picture of Germany's flood regime. Even this attempt however allows identifying fundamental cross-country variance in the use of risk in governance that can be related to a range of contrasting institutional variables in the two countries.

The table shows some interesting asymmetries that reveal insights into institutional settings in which flood management in the two countries takes place. First, the overall numbers of interviews is larger in Germany than in England. This is mostly a result of the Federal structure of Germany which allocates the responsibility for most aspects of flood management to the Länder/regional level. This also becomes obvious in the share of the Länder/regional category in the overall number of interviews with state actors (10/21, 48%) in contrast to England (2/11, 18%). Second, the share of the insurer category in the overall number of interviews is greater in England (5/18, 28%) than in Germany (6/29, 21%). This points to the different roles of state and market actors in the two countries' flood regimes. The composition of interviews is naturally not an entirely reliable indicator of state structures and state-market relations, because they are often not only influenced by the information needs of the researcher but also by the constraints on access and resources that the researcher faces. However as the empirical and analytical discussions of the following chapters show, the asymmetries in the interview data significantly reflect the varied relevance of different actors and levels of governance in the flood regimes of England and Germany.

Finally, the period of time that is under investigation in this study of the variations of risk-based flood management in Germany and Britain is defined by particular events, given the shift towards a more anticipatory and adaptive flood management as well as the advancement of risk instruments that were strongly driven by the impressions of major disasters. In Germany changes in flood management were initiated in the aftermath of the 1993 and

1995 Rhine floods. In England the most relevant flood events were the Easter 1998 and autumn 2000 floods. While there is no formal cut-off date for this investigation the process of major policy change came to a provisional end in Germany after the 2005 Federal Flood Control Act (Hochwasserschutzgesetz, FCA). For Britain the summer 2007 floods triggered another wave of policy change including the production of new types of flood maps specifically for surface water flooding, stronger provisions for the protection of critical infrastructure and improving the co-operation between the MetOffice and the Environment Agency. While these are important changes the most significant shift and reorientation of flood management –including the production of central risk instruments such as the National Flood Risk Assessment (NaFRA) – took place or were initiated in the aftermath of the previously mentioned flood events. Consequently while references are being made to more recent developments in England the analysis will focus on the change between 1998 and 2007. The two cut-off dates at 2005 (Germany) and 2007 (England) are also chosen because more recent policy changes have been shaped by the EU Flood Directive.

In short through extensive interviewing and the analysis of documents of actors based in and/or responsible for domains and areas that suffered large-scale flooding a substantive amount of data was collected and analysed to provide the rich empirical foundations required for the comparative small-n study of flood regimes in Germany and England. By using different types of methods the empirical evidence has been triangulated in addition to being (wherever possible) underpinned by relevant theoretical and analytical arguments.

### 4.3 CONCLUSIONS

This chapter presented the design of the comparative study into variations of risk-based flood management and the institutional variables that shape the emerging flood regimes. The short introductory chapter 1 presents some of the contrasts found in the organisation of and measures used in different

regime domains of the two countries' flood regimes that point to a possible variance in the use of the concepts and instruments of risk in the two regimes. Chapter 2 – based on the issue of flooding has indicated that the emerging anticipatory and adaptive approaches to flood management not only assign a central role to risk instruments and information but are also characterised by substantial complexity – highlighted the benefits of selecting flood management as an issue area for a study of the diversity in risk-based governance. Chapter 3's discussion of theoretical accounts of the rise of risk-based governance demonstrated that there is a lack of comparative analysis of diversity in risk-based governance. Comparative analysis with a view to identifying and explaining diversity therefore is explorative and requires an in-depth examination of why the involved actors take certain instrumental and organisational decisions.

These two features – the complexity and the exploratory character – of the research determine the research design proposed in this chapter 4. The risk regulation regime framework is comprehensive in its openness to a wide range of control mechanisms, making it possible to capture the complexity of flood management. At the same time it draws boundaries around the objects of analysis (the flood regimes) and imposes order on regime activities though the two-dimensional disaggregation of the regimes. Through the 'flood regime' lens it is possible to produce a comprehensive and nuanced picture of the relevance of risk instruments in different aspects of flood management in the countries under investigation. This facilitates the exploration of the diverse forms of risk-based governance and prepares for a systematic examination of variables that shape this variance.

The complexity of the domain under investigation and the study's exploratory character also puts limitations on its scope. This is the reason for limiting the number of country cases to two, Germany and England. Both cases (as chapter 2 has already indicated) have seen the emergence of multi-domain, anticipatory and adaptive approaches to flood management in which the role of risk instruments has been emphasised. At the same time Germany

and England display significant differences in institutional settings which render them suitable for exploring how variance in institutional constraints can contribute to differences in risk-based governance.

In order to gain an in-depth understanding of how the decisions of actors are made concerning the use of risk instruments in flood management and its organisation it is essential to collect rich and qualitative data that reveal the motivations and the rationalisations behind certain instrumental and organisational choices of actors. To this end 47 semi-structured interviews were undertaken in the two countries (in addition to one in Brussels within the European Commission). The interview data were complemented and triangulated with an analysis of policy documents.

## CHAPTER 5: FLOOD DEFENCES, THE NEOLIBERAL STATE AND ACCOUNTABILITY PRESSURES

The management of flood defences, from floodwalls to engineered retention basins to dykes, is most fundamentally about the use of government treasure to achieve particular flood management objectives within the flood regimes. The flood defence domain can therefore be explored as part of a wider discussion on the use of taxpayer money in pursuit of policy objectives.

Between 1945 and the 1970s many governments of advanced Western European states made extensive use of the tool of treasure, creating a comprehensive welfare state and investing into the economy – for instance, through the ownership of companies such as utilities. A good indicator is public sector expenditure in relation to GDP: across the members of the OECD this ratio has increased for several decades until it peaked in 1993 at more than 40% of GDP (Joumard et al. 2003). This 'more state' trend, however, attracted increasing criticism since the late 1970s, driven by the economic recession in many advanced economies, increasing government debt and the rise of neoliberal ideas. Neoliberal ideas, as introduced in chapter 3, advocate for 'less state' or in a less radical version a 'more economically efficient state'.

Neoliberal advocates of 'less state' object that 'too much state' is costly since it implies substantial expenditure, crowds out efficient private investments and sends the wrong behavioural signals to individuals that are being protected from risks (e.g. social risks) through collective mechanisms (e.g. social insurance). As neoliberals argue, 'less state' or a more 'cost-efficient' state means lower costs, a responsibilisation of individuals and more private investments. These arguments did not fall on deaf ears in the 1980s, in particular with the elections of the Thatcher and Reagan governments in Britain and the United States. Both emphasised privatisation and deregulation as key part of their governments' programmes. The rollback and reconfiguration of the state did not remain unchallenged, however. Neoliberal practices have also attracted substantial criticism, in

particular the withdrawal of state from providing social security to their populations (Peck 2001; Glyn 2006).

Can this general story also be told about the state's involvement in flood defences? Flood defences provided by the state mean that the state undertakes expensive investments to protect the population from risks to their lives, health and property. Have these costs come under scrutiny? Can a discernible trend towards withdrawal or – less radically towards greater economic efficiency in state operations be seen in the flood defence regimes of Germany and England?

These questions are closely related to the availability and role of the concept and instruments of risk within flood regimes. This is because risk calculations have been argued to be instrumental for neoliberal challenges to the security state.[30] In a nutshell, thanks to the quantification of probable damage via risk calculations, actors can allocate financial resources to areas where flood defences achieve greatest risk reduction. This in turn facilitates the state's concentration on economically sensible protection, withdrawing from non-economical protection to leave it to what then become 'responsibilised' individuals. This reconfigured security state can furthermore be linked to the discussion in chapter 7 about disaster financing based on insurance markets. The propagation of such market solutions in turn suggests another form of withdrawal of the state from its traditional role of safeguarding the fundamental financial security of its citizens and introducing private forms of risk regulation and management (based on price signals and private contracts).

In addition to the broader questions about the roll-back and reconfiguration of the flood-defending state, the following discussions therefore also specifically examine whether the rise of risk instruments can be linked to their use to this effect. Also, should the 'neoliberalisation' in flood defence management not take place and drive the use of risk in

[30] See discussion of neoliberal conceptions of risk-based governance in chapter 2.

governance, what factors may explain the particular organisation of this regime domain?

This chapter starts off with a discussion of the challenges to flood defence management, in particular from a neoliberal viewpoint, and examines how risk might assume an instrumental role in finding solutions to some of these challenges and accomplishing the expected rollback of the state. The following section analyses the organisation of the two countries' flood defence domains. Next, the question of whether the use of risk can be linked to a neoliberal transformation of the state's involvement in the flood defence domain will be explored, together with the reasons for and against. As an alternative role for risk in flood defence management, the issue of how risk is in both countries being used to organise and limit what actors can be held responsible for is discussed.

## 5.1 FLOOD DEFENCE MANAGEMENT UNDER PRESSURE

Floods are events that can harm the health and safety of the population. These undesirable consequences have for centuries led to efforts in societies to prevent them. One of the crucial means for reducing damage from flooding is the creation of good flood defences. Flood defences refer to engineered infrastructure that constrain the natural flow of water and includes constructions such as embankments, retention basins, dams and river channel expansions.

Historically such interventions were undertaken locally by individual riparian owners and privately organised collectives, such as England's Internal Drainage Boards or the Rhine River's *Deichverbände* (dyke associations). However, with increasing economic activity and population density along the rivers and other areas at risk from flooding, states increasingly got involved in the provision of security for their populations. With their ability to mobilise significant financial and technical resources, this engagement has led to impressive examples of state-sponsored engineered control over the forces of nature. About 7,500 kilometres of

dykes and 500 dams in Germany (LAWA 1995) as well as 46,000 flood defence structures in England (NAO 2007) are testimony to this.

The underlying notion of this technical approach is that water is seen as an enemy to the land-use needs and safety of society and is therefore to be controlled by engineered structures (Scrase and Sheate 2005). The strong faith in the control over nature through massive civil engineering was translated into an implicit promise of protection from flooding given by the state to its population. As Germany's inter-state working group water (LAWA) noted:

> "(...) in European high-tech societies, [individuals] adopted the idea that all risks are under control. Accordingly, floods could no longer happen. It is expected from the state to accommodate the security requirements of the population and to manage threats from flooding" (LAWA 1995:1).

This safety promise was not always given explicitly or absolutely. But its relevance was reflected in the limited or scant attention paid by flood managers to the accumulation of values behind flood defences[31] or to public flood awareness, measures only required if the protection through defences is uncertain.

Flood defences can certainly be seen as a great success story. In 2001 Britain's Ministry of Agriculture, Fisheries and Food (MAFF), then the responsible ministry for flood management, estimated that existing flood defences reduced the average annual cost of damage from flooding by over GBP two billion (NAO 2001). Moreover, the transnational International Commission for the Protection of the Rhine (ICPR) has found that the most effective means of reducing the most severe floods is through *engineered* retention basins right next to the main stream as compared to catchment-wide, *natural* retention measures that are particularly effective for local/regional and smaller events (ICPR 2005).

Recent flood events across Europe, however, had challenged this promise of safety as was reflected in a marked shift, at least in the rhetoric of policy-makers, from 'safety' and 'flood defence' to 'flood risk management'

[31] See discussion of land-use regulation in chapter 6.

and the emphasis on promoting a 'risk culture' in flood management (MAFF 1996; DKKV 2003; EA 2003). These challenges to the engineering paradigm in flood management are in many ways reminiscent of the challenges to other forms of security provision by the state.

One of the key challenges is cost. The Environment Agency, for instance, spent almost three quarters of its flood management budget of GBP 453 million for 2006/07 on the building of new and the replacement and maintenance of old flood defences (NAO 2007). In NRW the refurbishment of one kilometre of existing dyke would cost EUR 2 million (MUNLV 2008, interview). A LAWA expert therefore notes that the engineering-centric approach is:

> "basically over by now. This is at least partly due to the fact that such technical measures also have to be funded" (LAWA 2008a, interview).

Likewise, England's finance ministry HM Treasury, notes:

> "it is quite clear that flood programmes are limited by affordability, and not by projects for which there is a need" (HM Treasury 2009, interview).

This cost awareness of some of the central actors within Germany and England's flood regimes is accentuated by the failure of existing defences to protect the population fully from recent flooding events, as well as the fact that climate change is expected to increase the likelihood of extreme weather events (Bronstert 2003; LAWA 2004). Recent flood events have shown the limitations of flood defences, for example when the flood defences in Cologne were overtopped in 1993 or the Odra dyke partially failed in 1997. While predicting the impact of climate change at the regional and local levels is subject to considerable uncertainties, actors involved in flood management assume – based on their perception of increasingly frequent and severe events over the past two decades – that climate change will increase the risk of flooding and will require an increase in expenditure to manage this increased flood risk. In its Future Flooding report (2004), the Foresight authors predict for Britain that its annual expenditure on engineered measures in 2024 (for instance) would need to increase by a

factor between 1.4 and 2.2[32] simply to manage the increased risk of future flooding.

A second challenge comes from the adverse behavioural consequences of flood defences on flood management itself. As people feel safe behind protective infrastructure they have a limited awareness and preparedness for severe events that exceed the design standard, as well as continuing to accumulate wealth behind defences (White 1945; Parker 1995; ICPR 2005)[33].

Thirdly, a reliance on flood defences has also been criticised because of the adverse environmental consequences of engineered structures, for example on the biodiversity in wetlands. In response, flood managers have adopted additional goals and measures such as the creation of wetlands and washlands in England (DEFRA 2005) and Germany's '*renaturalising* floodplains and watercourses' (Bundesregierung 2005a).

How does risk help in this context of financial constraints and declining confidence in flood defences? Risk calculations can help formally quantify in monetary terms, first, the probable damage expected in a certain area, and second, the effect of the interventions in terms of avoided probable damage. These figures can then be compared with the varying costs of alternative risk management options. Through formal quantification and monetarisation such calculations enable actors to evaluate and compare the benefit-cost ratio and value-for-money returns of state activities in different spatial, temporal and sectoral contexts (for example the value of investments in different projects for the same flood management problem (project level) into defences at different rivers within a country (national/regional level) or investments into hospitals and schools compared

[32] The factor of 1.4 assumes the so-called Local Stewardship scenario of economic development and carbon emissions with associated flood protection needs defined as 25% lower than the current. The factor of 2.2 refers to the National Enterprise scenario for which a doubling of the protection level is assumed.

[33] This effect of flood defences will be discussed more extensively in chapter 5, which is on land-use regulation. Land-use regulation is one of the means to mitigate these behavioural effects.

with flood defences (sectoral comparison)).Risk instruments can therefore help in directing the state's scarce resources to where they can achieve maximum impact in terms of reducing the consequences from flooding or achieving a set of desirable ends. If value-for-money is to be maximised in aggregate across all government operations, calculations undertaken on a national scale will ensure that the greatest possible number of interventions is evaluated and compared for measuring and achieving the greatest cost-efficiency.

From the aforementioned perspective of a shift from 'more' to 'less' state, these positive effects of risk on flood defence management can be interpreted in two ways. From the perspective of advocates of neoliberalism a more targeted use of resources implies an enhancement of flood management. Economically evaluated state operations achieve 'more with less', allowing for a smaller state to achieve the same risk management results. Moreover, economically rational state operations imply that protection is not distributed to the same levels across the country, 'responsibilising' parts of the population to prevent or manage flood risk and thereby avoiding the aforementioned adverse behavioural consequences of being protected. Such a neoliberal understanding of risk-based flood management is further reinforced by the proliferation of campaigns for greater public flood risk awareness,[34] the promotion of more flood-resilient construction[35] and private insurance solutions[36] –all of which encourage individuals to take care of their own risks.

From a more critical perspective it would be argued that risk-based flood defence management boils down to a much more limited role for the

[34] England's Environment Agency launched an awareness campaign entitled 'Flooding. You can't prevent it. You can prepare for it' in 1999. Germany's Federal Environment Agency (UBA) published the brochure 'What you need to know about precautionary flood management' in 2006.

[35] Germany's Federal Ministry for Construction has published a 'Hochwasserschutzfibel – Bauliche Schutz- und Vorsorgemassnahmen in hochwassergefährdeten Gebieten' (BMVBS 2006). England's Department of local Government and Communities has published, Improving the Flood Performance of New Buildings – Flood Resilient Construction' (DCLG 2007e)

[36] These will be discussed in chapter 7.

state in providing protection to its population, as state interventions are subject to an economic logic of scarce resources rather than a duty to protect. The concentration on those measures that make economic sense would result in the protection of assets of greater value (as a result of the better benefit-cost ratio), thereby exposing the more vulnerable groups (with lower value assets) of society to greater risks.

But are these expected positive or feared negative effects of the proposed neoliberalisation of flood regimes really shaping flood defence management in Germany and England? To what extent does the use of risk facilitate this neoliberalisation? To begin answering those questions the following two sections (4.2 and 4.3) examine the form and role of the concept and instruments of risk in the flood defence domains of Germany and England's flood regimes.

## 5.2 Examining the role of risk in Germany's flood defence management

The organisation of Germany's flood defence domain involves a large number of actors. The most important ones are the 16 Länder governments that engage in risk assessments, standard-setting and the financing of flood defences. However, the Federal level (though less so than in the domains of land-use regulation and disaster financing[37]) also provides certain rules (primarily obliging the Länder to produce flood management plans through the HWSG). In addition, it offers financial resources through different financing vehicles and is responsible for navigation and shipping infrastructure on Federal waterways. These actors are complemented by the local water authorities that are responsible for smaller water bodies and the implementation of some of state-level flood defence programmes, transregional and transnational river commissions such as the ICPR as well as, especially in North Rhine-Westphalia (NRW), the privately organised

[37] See chapters 6 and 7 for details.

local *Deichverbände* (whose interventions are however, to a large extend funded by NRW's Lander government).

### 5.2.1 Detecting: Assessing existing protection and future risk levels

Detecting in the flood defence domain is concerned with measuring and monitoring the existing protection levels achieved through flood defence systems, assessing the probability of different flood events in the future (i.e. how frequently the Elbe reaches the level of nine metres at the Dresden gauge), and estimating the damage costs such flood events would cause. Germany's detecting includes stocktaking exercises of existing flood defences and their performance, probabilistic flood modelling as well as considerations of probable damages. What is notable about detecting in Germany's flood defence management is that while more systematic instruments for risk assessment have been promoted, often after flood disasters and driven by experts of specialist public bodies (ICPR, LTV, DEZA), the detecting framework remains strongly fragmented.

Calculations of risk are nothing new for actors within Germany's flood defence domain. Early and extensive risk assessments were undertaken for the Rhine River. For instance an examination of defence performance and the probability of flood events was undertaken in the late 1970s for the *Upper* Rhine[38] by the International Commission for Research on Floods of the River Rhine (*Hochwasserstudien-Kommission für den Rhein*) (HSK 1978). Another set of risk assessments was conducted for NRW for its *Generalpläne Hochwasser* (General Flood Management Plans) in the late 1980s (e.g. SAWAD 1990; e.g. SAWAB 1991). While these assessments provided some important, more formalised insights, mostly into the frequencies of certain water quantities along the Rhine river, they were neither systematically co-ordinated with other assessments along the Rhine catchment nor did they take into account damage potential. Focused solely

[38] The Upper Rhine is the Rhine stretch between Basel (CH) and Bingen (GER). The other parts are High Rhine (Basel), Middle Rhine (Bingen-Cologne), Low Rhine (Cologne-Lobith), and the delta of the Rhine (Lobith).

on the probability of inundation they were, strictly speaking, flood hazard assessments rather than assessments of flood *risk* in the classical sense.

This changed after the Rhine floods of 1993 and 1995. The floods left a sufficient impression on the environment ministers of the Rhine riparian countries to ask the International Commission for the Protection of the Rhine (ICPR) to develop the co-ordinated, catchment-wide Rhine Flood Action Plan (RFAP), a surge of activity that one of the involved experts within the ICPR attributed to a disaster-driven approach to flood management – in her words to 'management by accident' (ICPR 2008, interview). While the initiative started with politicians (through ministerial conferences of the Rhine riparian countries' environment ministers in December 1994 and March 1995), the development of the plan and its components was left to the water management experts from the ICPR's member states.

The experts assigned a central role to flood assessments beginning with a so-called *Bestandsaufnahme* (stock-taking of protection level from existing flood management measures along the entire Rhine). This exercise was to provide the informational foundations for the definition of standards and goals within the ICPR's Rhine Flood Action Plan (ICPR 1997a:10). The stocktaking exercise focused on documenting and comparing existing protection levels along the Rhine. The ICPR also produced the influential flood risk map 'Rhine-Atlas'. The 'Rhine-Atlas' taking into account the effects of existing defences displays the inundation from water quantities with different probabilities (HQ10, HQ100 and HQextreme) as well as the damage potential for extreme flood events. While the 'Rhine-Atlas' fits with one of the four goals of the Rhine Flood Action Plan, namely to raise flood risk awareness, the experts also perceived it as a means of 'political persuasion' (ICPR 2008, interview) to raise the profile of flood issues among policy-makers at both local and national levels.

Another pioneering initiative of risk assessments was undertaken in Saxony after the 2002 Elbe floods. Saxony as the most affected state

received substantial financial support from the Federal and other Länder governments, as well as significant intellectual support from international partners for overhauling its flood management. The most important source of expertise was Switzerland's development co-operation and humanitarian aid agency (*Direktion für Entwicklung und Zusammenarbeit-DEZA*). As an expert from Saxony's State Reservoir Authority (LTV) notes:

> "the Swiss arrived in Saxony just a few days after the event, with engineering know-how. We naturally accepted their help. Of course, we consequently integrated their flood philosophy into our approach, after an assessment, gradually and adapted to local circumstances. (...) The first thing the Swiss undertook with us was the event analysis. For them, it had the benefit that they were likely to draw lessons for their own flood management" (LTV 2008, interview).

Saxony's water management specialists developed comprehensive and integrated flood protection concepts (*Hochwasserschutzkonzepte*) for each catchment area. Each concept included an analysis of a major historical flood event, an assessment of the probability and intensity (water depth and velocity) of potential flood events, calculations of the damage potential, as well as an assessment of existing defences (Socher et al. 2006a). These individual catchment assessments were undertaken on the basis of the same methods developed and applied by the state-level agencies LTV (State Reservoir Authority) and LFUG (State Environment Agency), supported by their Swiss colleagues.

As these initiatives in prominent flood management sites in Germany show, the assessment of existing defences and probable flooding has been stepped up in recent years, driven by post-disaster political pressures from the electorate to respond decisively and by the lobbying by the professional experts in water management authorities in Germany and beyond. In contrast to earlier risk assessments the instruments also include calculations of probable damages. Damage potential assessments were of much less interest to water authorities before the flood events of the 1990s and 2000s – not only because the assessment techniques were still underdeveloped[39] but also

[39] Data on damage from flooding was only systematically collected by the LAWA since the late 1980s in the so-called HOWAS database.

because existing dykes, especially along the Rhine river, were assumed to provide sufficient protection[40], making damage assessments redundant.

These emerging risk assessment instruments can therefore potentially facilitate an economic evaluation of Germany's flood defence management that would provide information on the potential benefits of flood defence measures (avoided probable damage) – as desired by the advocates of neoliberalism. However, the instruments themselves are heterogeneous and their application remains fragmented, rendering a trans-Länder economic comparison of different options for public infrastructure spending impossible. Saxony's elaborate and consistent assessment methods are applied to assessing flood risk within Saxony only. For the ICPR's initiatives, while the results of these assessments are presented as catchment-wide information tools the calculations are based on data and variable methods used by each of the member states of the ICPR. For instance, the 'Rhine-Atlas' draws on several digital terrain models based on varying methods applied to different stretches of the river[41]. These modelling inconsistencies make it difficult to compare levels of risk between the different parts of the Rhine catchment depicted in the Atlas. Moreover, the Atlas shows little local detail as its coarse spatial scale (1:100,000) was chosen 'because we as the ICPR are not allowed to interfere with local affairs' (ICPR 2008, interview).

[40] In fact, one expert from NRW's environment ministry observed, that when local authorities and dyke associations were approached with new calculations of probable flood events before 1993, the local actors called him a 'Fachidiot' (one-track specialist) and 'Bürokrat' ('bureaucrat') (MUNLV 2008, interview), dismissing the modelled water quantities and revised design standard for dykes as being implausible and unnecessary. Given this faith in the adequacy of flood defences along the Rhine the issue of damages did not seem very relevant. It also underpins the experts' interest in macro-level damage potential assessment as a tool for 'political persuasion' and the importance of floods to step up political action on flooding.

[41] In terms of digital terrain models for instance, the following ones are in use for the Rhine-Atlas modelling: in Switzerland, the so-called DHM25 Matrixmodel, in France the *Base de donnees altimetrique* (BD-ALTI), in Germany's Baden-Wurttemberg the DHM-BW, in Hesse the DHM40, in Rhineland-Palatine DGM-RP, in Northrhine-Westphalia a terrain model taking from a research project on potential flood damage at the Rhine for which various DTMs were combined, and in the Netherlands the model from the research project *Overstromingsrisico's Buitendijkse Gebieden* (ICPR 2001).

This fragmented nature of 'detecting' reflects the concentration of operational and political responsibility at Länder level in Germany's flood regime. This allocation implies that the expertise required for risk assessments is mostly concentrated at the Länder level, along with locally specific knowledge held by regional and local environment agencies and authorities.

But a more centralised risk assessment is also a result of the politics between different levels of government in Germany. Allowing for a more centralised risk assessment implies central government interference with Länder affairs, imposing implementation costs for risk assessments on – and more generally, reducing the political discretion at – the Länder level. If Länder use different methods to calculate HQ100 any standardised direction of risk assessments potentially imposes costs to overhaul risk assessments. The financial and administrative efforts of risk assessments become visible in the reluctance of the water authorities to update and revise their risk assessment at 'normal' times – that is, without the additional pressure triggered by a crisis event. An official of the Federal Ministry of Environment observes that:

> "assessments such as maps are only updated when the water authorities are forced to do it. The deficiencies only become apparent at the next flood event. If nothing happens, no adjustment takes place" (BMU 2008a, interview).

Apart from the costs of risk assessments these assessments serve as the basis for flood management in general. Länder are very cautious to safeguard their overall responsibilities in flood management. As another official from the ministry notes:

> "the interest of states to retain control over flood risk management is, on the one hand, for historical reasons. Every state has its own tradition, conception, and perceived challenges concerning flooding. Rhineland-Palatine, for instance, was a great critic of the HWSG because it praised itself as being one of the most exposed and best organised flood managing states. [They argued:] 'We just don't want the Federal level to tell us about how to do it better'. (...) On the other hand, if we are talking about political responsibilities, we are talking about [the distribution of] political power. This is especially relevant in a field which is about costs, obligations, and restrictions... here, the Länder prefer to set their own rules" (BMU 2008b, interview).

These barriers point to the difficulty in producing transregionally consistent risk assessments and risk-based management plans in Germany, limiting the ability to evaluate different investment and management measures across the whole country. From the perspective of the advocates of neoliberalism this is, however, of great importance for comparing the value-for-money of different uses of public investments at the national and sectoral levels. The discussion revealed that while risk assessments are strongly expert-driven, disaster politics ('management by accident') and institutional structures (decentralised allocation of responsibilities and resources as well as resulting interplay between different levels) shape the form risk assessments take – in a manner that impedes a nation-wide 'neoliberalisation' of flood defence management in Germany.

### 5.2.2 Directing: Standards of and responsibilities for protecting from flooding

Directing in Germany's flood defence management is mostly about defining the particular standards of safety that flood defences should be designed to meet. These standards of safety normally refer to specific hypothetical events that no longer cause harm thanks to the prescribed protection provided by flood defences. By defining such events directing also allocates responsibilities between state and society – that is, which events different state actors offer protection against and which events are deemed 'acceptable' risks.

In Germany's flood defence domain the minimal risk-based safety standard is in general defined for flood defences as HQ100. That implies that properties normally are to be protected against an event that statistically occurs once or more in 100 years (even though (see below) there is some variation in the standards). If an event occurs that is statistically less frequent – for example once in 150 years (HQ150) – individuals need to expect to be flooded. HQ100 therefore defines the responsibilities of Germany's 'infrastructure' state vis-à-vis its population in spite of the state's fragmented allocation of flood management responsibilities. As the following chapter 6

will show, HQ100 is equally central to the land-use domain and therefore also defines the boundaries of Germany's 'regulatory' state.

The HQ100 standard has become a central reference point in Germany's fragmented flood regime through its use at both Federal and Länder levels. The Federal Flood Control Act (HWSG) from 2005 explicitly identifies a HQ100 flood event as a key reference standard for the design of flood management plans (according to paragraph 31.d WHG). The Länder are therefore obliged to spell out measures for run-off management, flood protection infrastructure and safeguarding/expansion of retention space for the purpose of minimising threats resulting from flood events with a return period of 1-in-100 years. While safety is not promised (the statutory obligation is to 'minimise', not eliminate, the threat), a particular level of protection is aimed for across Germany. Accordingly, flood management plans on the Länder level are geared towards achieving the HQ100 standard through a set of measures including flood defences. In NRW for instance, HQ100 is the so-called *Bemessungshochwasser* (BHQ) (reference flood event) towards which the construction and maintenance of flood defences is oriented. Saxony's flood protection concepts are also geared towards HQ100 in most cases but not all. Saxony's standard-setting offers a greater variability. HQ100 is the standard that applies for areas in which larger population groups need to be protected, for example in urban areas. This standard is complemented by 'laxer' safety standards that apply to other, less populated areas. Using qualitative descriptions of different land uses Saxony defines as safety level HQ25 for *isolated* developments and local infrastructure and HQ5 for farmland (Socher, Dornack and Defer 2006a:305).

The central HQ100 standard has a long tradition in Germany's water management. One expert (Regional Water Authority Düsseldorf 2009, interview) suggested that the Prussian water authorities used the extreme flood from 1890 to determine the water quantities of the reference flood event for floodplains and defence construction and that this historical flood

event had roughly been equivalent to a HQ100 flood. Another expert (LANUV 2009, interview) noted that when systematic flood flow modelling began in the 1970s they used HQ100 as reference standard. This long-established history of HQ100 also suggests that among flood managers, 'everyone has a rough idea of what it means' (BMU 2008a, interview). Beyond its historical entrenchment some experts explain the choice of HQ100 with the rationale that individuals are statistically at worst likely to experience one major flood in their lifetime (ICPR 2008, interview; LAWA 2008a, interview).

A uniform minimal standard of protection – at least where larger groups of population would be affected by flooding – is however prone to political conflicts. It implies that safety for the population is provided to the population to an equal degree. This is problematic because it may imply for instance that (populated) areas with mostly agricultural production be protected to the same level as higher-value urban areas. In other words urban taxpayers subsidise the safety for rural areas in which relatively fewer taxpayers live and lower values are being protected. As a local flood manager of Saxony's capital Dresden notes:

> "Dresden's city centre, for instance, needs to be protected. But those that live in the countryside, can the state really protect them? Well, we can only offer some basic safety" (Local Environment Authority Dresden 2008, interview).

In Saxony, the difference in the consequences of flooding is reflected to some extent in the greater variability in standards that allows for lower protection for isolated developments and farmland. However, once larger groups of people are at risk (i.e. groups that do not live in isolated developments) HQ100 is to be applied.

The flipside to these conflicts around the objective of undifferentiated protection is the fact that Germany's flood managers perceive varying protection standards as highly problematic. An expert from the Federal Institute for Hydrology (bfg) wonders:

> "OK, then there is the question how to explain it to the citizens why they get less protection than others. So here is the problem how can we defend such asymmetry politically?" (BFG 2009, interview).

This 'political' concern also has a judicial side to it. Politically the concern for being protected adequately is often felt in particular by local politicians. For instance during a post-2002 conference of Saxony's mayors the local politicians expressed their concern about the order of the implementation of repairing and investing in flood management infrastructure – that is they were interested in benefiting as quickly as possible from remedial action (SMUL 2008, interview). One reason for this local pressure for investment can be associated with the perceived risks of inadequately protecting the population. A Landes expert in NRW describes how

> "there is nothing more dangerous than a below-standard flood management measure which suggests safety that it cannot deliver. If the citizen notices a flood defence, it should protect him against an appropriate flood event" (LANUV 2009, interview).

This 'danger' can be interpreted in two ways. Firstly, the population may be less aware of the danger than necessary in view of an actual protection level below the expected HQ100 standard. This can potentially lead to greater damage as individuals do not take precautionary measures, such as using tiles rather than carpets in their basements. Secondly, the risk is 'political'. If a house is protected by a below-HQ100 flood defence then the responsible actors – for example local authorities and dyke associations for smaller water bodies – will be blamed for the failure to protect against events with probability equal to or higher than HQ100.

The 'political' concern is hardened by the options open to individuals to contest administrative actions such as the investment and construction of a flood defence system judicially through the public law court system (*Verwaltungsgerichtsbarkeit*). One illustrative case is the response of NRW flood managers to their obligation (through the Federal Flood Control Act) to produce a list of rivers for which flood management plans are required. Länder actors have some discretion in how to interpret the Federal obligation

because rivers can be excluded from the list on the basis of an expectation of 'not significant' damage from flooding. However, NRW flood managers drew an extensive list of rivers slated for flood defence investment in an attempt to pre-empt legal challenges from those left out. An NRW expert points out:

> "so, we have got our list of rivers for which we devise a plan, formally only if we expect significant damage. But then there is a farmer who suffered from a flood the year before and cannot find the river on this list. He says: "But look, this river is dangerous, too. I had substantial damage". And even where the citizens understand that not every single river can be controlled, still, there can be organisations that instrumentalise this legal clause. So this was our fear and that's why we have a rather long list of rivers" (LANUV 2009, interview).

This is not only a hypothetical risk to flood managers. Several decisions of administrative law courts in Bavaria point to the state's obligation to provide a minimal level of protection against HQ100 floods to ensure the health and safety of the residential and working population (LAWA 2004).

German flood managers face political and judicial constraints when setting standards for flood defences. The risk-based uniform standards of safety (normally at a HQ100 level) form the regulatory core of this domain in Germany that is shaped by a long history of expert use and accommodates the judicial and political requirements for state actors to provide equal safety to all groups in society. In contradiction to claims about the rolling back of the state as the driver for risk-based instruments meeting this risk-based safety standard is costly, and the economic performance per euro spent on flood management is not being explicitly taken into account in this type of standard-setting.

But the HQ100 is not only about an equal safety 'promise'. It also defines the boundaries of state responsibility. Events beyond HQ100 can be understood as residual risks for which the individual has to take precautions (e.g. through insurance (LAWA 2004)). While drawing a boundary between state and private responsibility in general fits well with the ideology of neoliberalism, the commitment (through the reference standard of HQ100) of the German state to provide safety to its population is substantial. The

relatively ambitious safety level (remember that HQ100 implies statistically that an individual with a normal life expectancy of around 80 years would need to be 'unlucky' to be affected by a flood even once in a lifetime), the fact that this safety level is applied relatively uniformly across Germany and the temporal stability of the protection level of HQ100 (see the aforementioned historical origins of the HQ100 reference standard) casts doubt on any arguments about the retreat of or a greater emphasis on economic efficiency by the state, at least when it comes to the function of 'directing' in the flood defence domain.

Another function of the standard is to delineate the responsibilities of the Länder actors from those of local flood managers that might in view of local political, economic and/or hydrological circumstances deviate from the HQ100 protection level. One example of this use of risk-based standards is flood management in Dresden, Saxony's capital. The state of Saxony in general aims at providing HQ100 protection for urban areas and is responsible for main rivers (so-called *Gewässer 1. Ordnung*), such as the Dresden's rivers Elbe and Weisseritz.

However, the local government's intentions differed. For the Elbe river it wanted to avoid unsightly flood walls and other engineered defences typically used to deliver HQ100 standards of protection. As one official explained, the city is a 'very special place with a harmonious relationship between city and river space' (Environment Authority Dresden 2008, interview). The city insisted that there was no space for high flood defence structures that obstructed access to the Elbe. However, for the Weisseritz river, a fast-flowing river causing many of Dresden's 2002 flood's fatalities, the city's government sought HQ500 protection. The governments of Dresden and Saxony eventually resolved their differences through an agreement that Dresden's flood defence would be managed by the local government rather than from the Land, shifting the political responsibility for lower protection levels along the Elbe and the financial responsibility for higher protection levels for the Weisseritz from the Land to the city

(Environmental Authority Dresden 2008, interview). Beyond limiting state responsibility for protecting the population to a particular standard, risk-based standard-setting also serves important functions within Germany's Federal state by delineating and clarifying responsibilities between different levels of government for flood defence management. Such a defining of responsibilities for protection contrasts with neoliberal expectations of reducing the responsibilities of the state for or making state operations more economically efficient in providing protection to the population.

### 5.2.3 Effecting: Scale and allocation of investment into defences

Effecting in the flood defence domain reflects the techno-centric nature of this domain. It uses hard infrastructure measures to influence the behaviour of natural processes that is the flow of water. The key question for effecting, especially as this discussion is about the government tool of treasure, therefore concerns how the financial capital required for these interventions is allocated.[42] In fact, the effects of flood defences on human behaviour are normally described as negative because defences provide the protected population a (sometimes) false feeling of safety. Within flood regimes more generally, human behaviour is directly targeted through land-use regulations and economic incentives in disaster financing, which are the subjects for the next two chapters.

In Germany's flood defence domain two important factors shape the availability and allocation of money. First, money is made available to those projects that allow the state to protect the population to the level of HQ100. Secondly, the availability of the funding is mostly driven by the politics of

[42] The 'treasure' is not the only aspect that is relevant in effecting. The actual implementation of a HQ100 standard is also a considerable technical challenge, as are associated negotiations with the owners of the land on which a flood defence structure is to be installed. Resistance to flood defence structures sometimes also originates from local environment groups that complain about the adverse consequences of the chosen protective infrastructure project. One example is the planning of the technical retention basin near Meisdorf in the Selketal of Saxony-Anhalt that led to protests because 80,000 square metres of land in a natural reserve would be used (Mitteldeutsche Zeitung Quedlinburg, 1 Oct 2007) However, as noted, this 'neoliberalism' discussion focuses on the use of public money.

disasters (that is money becomes available under the impression of a disaster) and the Federal state (i.e. amount and allocation of funds at macro-level is shaped by negotiations between different levels of government). The considerations of the economic efficiency of flood defence operations central to neoliberal ideas of the economically efficient state are only of secondary importance and if at all, primarily on the level of individual projects.

The importance of achieving certain levels of protection is reflected in the allocation practices at the Länder level. In NRW where the implementation of flood defence projects is mostly undertaken by local authorities and dyke associations, the local actors can claim 80% of expenditure for the flood management plan only under the condition that 'the measures actually protect to an HQ100 level' (LANUV 2009, interview). Equally, Saxony's resources are allocated to achieve particular safety standards, mostly HQ100.

The comparative analysis of relative costs and benefits is only used at project-level to choose between different flood defence projects that are designed to achieve the HQ100 standard for a particular area. That means that the safety standard is taken for granted and benefit-cost considerations cannot take precedence. Precedence for benefit-cost-considerations could in principle imply that once a certain benefit-cost threshold has been met, a project can be implemented regardless of the protection level provided. In fact, the particular approach to the economic evaluation of projects, the cost comparative approach (*Kostenvergleichsrechnung*), underlines the secondary importance of economic efficiency considerations. A cost comparative approach assumes the benefits of an investment to be the same (e.g. the protection to the level of HQ100) and compares the costs of the different investments required to achieve these benefits. The importance of this approach is underpinned by the fact that LAWA (2005) has published non-binding project appraisal guidance on cost-comparison approaches (rather than publishing guidance on cost-benefit analysis, as seen in England's

Project Appraisal Guidance documents that will be discussed below). Cost comparison is for example practiced in Bavaria where the selection and comparison process starts with the HQ100 standard as reference value, followed by comparing the costs of individual project proposals to achieve this standard (LAWA 2008a, interview). In Saxony however, avoided damage is being considered in the comparison of projects. Saxony prioritises different measures on the basis of its sophisticated 'SMS' model that takes into account damage potential, cost-benefit ratio, vulnerability measures, as well as ecological and flood management benefits (Socher et al. 2006b). That notwithstanding, the actors use the model only to prioritise among a list of prospective measures that protect up to the predetermined safety standards.

In short, achieving prescribed levels of protection outweighs considerations of economic efficiency in Germany. An interviewee from NRW's Landes Environment Agency notes:

> "what has in my opinion never happened here is that a flood defence measure has not been approved because the costs for the measure were higher than the protected damage potential" (LANUV 2009, interview).

The reason for the emphasis on safety rather than the economics of flood defence funding is political risk. In the words of a LAWA expert:

> "in my experience, it is almost impossible to try to refuse the funding of flood defences to the affected with reference to the benefit-cost analyses" (LAWA 2008, interview).

These observations of flood managers suggest that public expectations are geared towards a certain level of protection by Germany's state regardless of the particular costs this protection would entail.

Economics is not only marginalised at the Länder and local levels by political concerns about the political damage that trading-off the safety of citizens (and potentially the assets of specific groups such as farmers) against flood protection costs may carry. The allocation of Federal funding is driven by the political dynamics between Länder and Federal level in the context of joint funding initiatives. One example is the so-called '*Gemeinschaftsaufgabe Agrarstruktur und Küstenschutz* (GAK)' (Joint Task

Rural Structure and Coastal Protection) whose portfolio includes flood management. Over the last ten years (2000-2009) the GAK distributed a total of almost EUR 1.8 billion for water management and rural infrastructure (*wasserwirtschaftliche und kulturbauliche Massnahmen*) among the Länder. The allocation of these funds between the Länder follows the so-called '*Königsberger Schlüssel*', an allocation rule developed for Federal higher education spending proportional to Länder population numbers. Benz notes that such negotiations between different government levels within Germany imply distributive conflicts and that these in turn make it difficult to 'concentrate resources on regions in need' (Benz 1999:56). Rather than allocating funding to where risk is largest, the allocation is driven by political negotiations and settlements between different levels of government. A politically acceptable distribution of resources and the financing burden outweighs considerations of risk for this type of funding.

The approach to allocating money therefore follows the practices found in standard-setting in Germany; it emphasises safety rather than following the principles of economic efficiency, driven by an awareness of the political risks in failing to protect the population to a similar level. These political considerations are complemented by further considerations of a political (rather than a risk-based) proportionality in allocating funding that can be linked to the decentralised allocation of responsibilities in Germany's flood regime. With such allocation principles in place it is no surprise that there are indications that funding for flood management is not in a linear decline (see table 8). At the same time, given the aforementioned costs of flood defences and the ambitious protection levels, it is interesting to explore whether the financial resources are made available in a sustainable pattern.

Finding data on funding is complex in Germany's flood regime. Even within a single Land, such as Saxony, flood managers draw on multiple funding schemes including in Saxony's case the EU Solidarity fund, the Federal-Länder special fund (*Sondervermögen Aufbauhilfe* after

the 2002 Elbe flooding), the GAK and other programmes from various governance levels. In fact Saxony's LTV has been acquiring funds from 16 different sources since 2002 (LTV 2006). The following table focuses on three sources, namely the aforementioned *Sondervermögen*, the GAK funding mostly used for water management and the most regular budget item relevant to flood management in Saxony's overall budget.

| In million EUR | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** |
|---|---|---|---|---|---|---|---|---|---|
| **Landes funding for LTV** | 13 | 14 | 13 | 13 | 10 | 10 | 20 | 20 | 29 |
| ***Sondervermögen*** | N/A | 49 | 193 | 394 | 167 | 176 | 75 | 78 | 57 |
| **GAK funding Saxony** | 1 | 39 | 30 | 22 | 32 | 24 | 29 | 24 | 28 |

**Table 8: Spending on environment and flooding, Saxony**[43]

One part of the image that emerges casts a doubt on whether the safety goals can be achieved over the longer term. The *Sondervermögen*[44] is clearly disaster-driven with funding only available and stepped up after 2002 peaking in 2004 and declining substantially thereafter. Even the share of Saxony's GAK spent on water management rose extraordinarily after the flood in 2002. However, the amount of Saxony's GAK overall share[45] spent on flood management remained relatively stable ever since pointing to a more stable financing of flood management. This is confirmed by the Landes funding. The regular funding under Saxony's budget has after a slight

[43] This *Sondervermögen* row draws on data from the Annual Corporate Reports (*Geschäftsberichte*) of the LTV between 2003 and 2009. The other data is drawn from the budget in the documents Haushaltsplan 2001/2002 to 2009/2010, retrieved from the Saxonian Parliament website http://edas.landtag.sachsen.de/ on 18/01/11. The figures on the state funding of LTV concern the budget item 51 '*Hoheitsaufgabe Hochwasser-schutz/Stauanlagen*' (state task Flood Management/Dams) which is the most time-consistent budget category relevant to flood management. The GAK funding for Saxony concerns the category of water management (*wasserwirtschaftliche und kulturbauliche Massnahmen*). The data is retrieved from the BMELV website http://berichte.bmelv-statistik.de/GAT-9500000-2008.pdf on 25/1/11.

[44] Further details on the Sondervermögen can be found in chapter 7. The Sondervermögen is a joint funding of Federal and Lander government of EUR 6.5 billion, and was made available for reconstructing flood management infrastructure and financing disaster damage.

[45] Saxony's share in the GAK remained at around 5% of the total GAK funds, in line with its share in the total population of Germany.

decline between 2002 and 2006 (reflecting the availability of alternative sources of income) even been more than doubled between 2001 and 2009.

That notwithstanding, concerns about the long-term availability of sufficient resources can be raised. Resources for the management of floods as relatively rare events are particularly vulnerable to cuts. A senior official in Saxony's Environment Ministry recalls the situation before 2002:

> "Saxony's engineered flood defences were not very well-maintained. Because over the entire duration of the GDR, except 1954, there were no floods. The institutional memory was no longer existent. This even led to the situation where my predecessor suggested to dissolve the [flood management] division. 'Because flooding no longer exists!'" (SMUL 2008, interview).

Whether these financial pressures can be resisted thanks to the more systematic approach centring on the flood protection concepts will be interesting to watch. At the Rhine river, the planned measures of ICPR's Flood Action Plan have been implemented to a large extent. As the ICPR's representative observes:

> "And because at the early stages of the RFAP, the political pressure concerning flooding was still quite substantial, money was supplied. And for the future, well, it is always the case that the necessity and urgency of measures declines the longer the period without a flood was at a river. But for the Rhine, I assume that whatever was planned through the Action Plan will be implemented. This is all already in the pipeline. But we also know that through these measures alone, we won't be able to achieve our goals" (ICPR 2008, interview).

Germany's flood regime reveals funding patterns that do not imply a substantial or linear financial trimming of the 'security state'. The state does indeed assume financial responsibility for flood defences especially when driven by political pressures after a flood disaster. This latter aspect of the funding dynamics raises a different problem. An ambitious and uniform safety standard is being applied widely in 'directing', but the sustained funding required actually to meet and maintain that standard is often unavailable without the spur of major flood events (as Saxony before 2002 and NRW before 1993 show). Faced with the problem of waning attention from elected officials several experts admitted that they sometimes welcome flood disasters – seeing them as a way to sustain the funding required to

fulfil their institutional obligations to effect the standards of flood defence they have been directed to deliver, where the obligations are not always accompanied by the resource allocations required to do so (e.g. LTV 2008, interview; ICPR 2008, interview).

This discussion of the organisation of and use of risk in Germany's flood defence domain has shown that even though suitable information tools are in place (albeit fragmented), they are not being used for rolling back the security state and introducing an economic efficiency orientation for flood defence management. Rather, an emphasis on equal safety for the population (reflecting an underlying fundamental objective of state-provided security and solidarity between different groups of society) prevails throughout the domain. Had economic efficiency logic prevailed as proposed by neoliberalism advocates, safety standards would have been systematically linked to the protection of monetary value alone and funding would have been allocated in accordance to the relatively greatest values protected by the money spent on flood defences. Introducing a differential treatment is perceived and experienced by the responsible German actors as politically and juridically risky. However, an approach stressing equal safety levels also carries substantial risks, financially (the costs of equal protection) and politically (failure to meet public expectations). In this context, the concept and instruments of risk emerge as means to define the boundaries of what governments at different levels can be held politically and financially accountable for.

### 5.3 Examining the role of risk in England's flood defence management

At a first glance the organisation of England's flood defence domain appears to be almost as complex as Germany's with a large number of actors and institutions arrayed across several levels and branches of the state and associated public bodies. Local authorities, internal drainage boards (IDBs), the Environment Agency (EA) and its Regional Flood Defence Committees (RFDC) all share responsibilities for the operational aspects of flood

management. However, apart from the fact that the overall policy responsibility is concentrated in one central government department (since 2002 DEFRA, following on from MAFF), a gradual centralisation of operational responsibilities can be observed over the period since the 1970s. The landscape of operating authorities has shrunk in terms of numbers and fragmented responsibilities over the decades, with the IDBs and local authorities whose responsibilities were concerned with smaller, 'ordinary' water bodies and the 46 catchment boards originally instituted under the 1930s Water Resources Act being consolidated into ten regional water authorities (following the 1973 Act) and finally a single body, the National Rivers Authority (NRA), in 1989.

In 1996, the Environment Agency (EA) took on flood management in England and Wales. As a non-departmental public body the EA operates in line with the government's national policies and strategy and delivers the targets set out by Defra (MAFF 1993b; DEFRA 2005). The EA and its remit initially continued to reflect the complex nature of Britain's flood management by taking decisions through ten Regional and 17 Local Flood Defence Committees (RFDCs, LFDCs). However, in the aftermath of the Easter 1998 floods the LFDCS were abolished and other steps were undertaken to strengthen the central office of the EA. Following the flood events in 1998 and 2000 the EA also saw its remit expanded to include critical ordinary watercourses, as well as being given a stronger general supervisory role over all types of flooding (DEFRA 2005).

### 5.3.1 Detecting: Assessing existing defence structures and future risk

England's detecting has changed significantly in the aftermath of the 'wake-up calls' of the Easter 1998 and autumn 2000 floods. A central government-provided integrated risk assessment instrument can be found at the centre of the detecting function. The centralised instrument is a response to varying pressures on central government flood managers. These include criticisms of the variable quality of fragmented risk assessments prior to the 1998 floods, insurance industry pressures and the insurers' own nation-wide risk

assessment efforts, together with the functional need of a centralised evaluation tool for infrastructure investments.

Before the Easter 1998 flood event information on the probability of flood events, the performance or even existence of flood defences and the damage potential was largely[46]collected regionally or locally where it was collected at all. As Bye and Horner note in their report on the 'lessons learned' in the aftermath of the Easter 1998 floods there were important gaps and inconsistencies in the production of the surveys of flood prone 'hotspots' called for under Section 105 of the 1991 Water Act:

> "considerable work has been undertaken on these [Section 105] surveys, but with approaches and rates of progress differing between the regions, the exercise is far from complete nationally" (Bye and Horner 1998:40).

Similarly, the Institute of Civil Engineers (ICE) reported that:

> "there is no agreed national standard with regard to [flood hazard] models, although some regions have adequate rainfall-runoff-models" (ICE 2001:49).

Beyond the pressures on central government emanating from public critiques of the variable risk assessments provided in 'lessons learned' reports, the insurance industry was also calling for improved risk assessments (including for instance a centralised stock-taking of existing flood defences) among their list of demands on the government. As will be discussed in greater length in chapter 7, the insurance industry's demands carry a special weight because they bear the entire financial risk of flooding as the exclusive provider of financing for flood damage in England.

In response to these pressures a number of information-gathering efforts were launched after the 1998 and 2000 flood events. The Ministry of Agriculture, Food and Fisheries (MAFF) developed the so-called High-Level Targets in 1999 to ensure the monitoring of policy delivery by the operating authorities. High-Level Target 4 obligated the Environment Agency to create a National Flood and Coastal Defence Database (NFCDD)

[46] The first rough attempt to do a nation-wide flood map actually dates back to the 1996 Institute of Hydrology (IoH) map. However, the so-called IoH130 report was aimed at insurers, not flood managers, in IoH's pursuit of commercial opportunities.

and the other operating authorities to provide data on defences to the Agency. Furthermore the EA, within its recent 2003 'Strategy for flood risk management', commits to developing:

> "a modelling strategy to ensure consistency, coordination and multiple uses of model development and operation. Decision support will increase the effectiveness of our business decisions, both in terms of exploring flood risk management solutions and in balancing funding between our activities" (EA 2003:11)

These centrally collected and generated assessments served as precursors and inputs to the annual 'National Flood Risk Assessment' (NaFRA) whose first version became available in 2004. NaFRA includes probabilistic analyses of flood risk that also account for the location, type, condition and performance of flood defences. Based on these assessments each territorial cell in NaFRA is assigned to one of three different risk categories that reflect different probabilities of inundation (HQ200 and less- low; HQ75-200- moderate; more frequent than HQ75- high).[47]

In addition MAFF initiated the collection of data on the damage potential of floods through the 'National Appraisal of Assets at Risk' (NAAR) (DEFRA 2001). In the years following the initial publication of NAAR the damage potential assessments were further refined and combined with probabilistic analyses in the integrated risk assessment instrument NaFRA, as described above.

England's risk calculations for domain of flood defence management are, in contrast to Germany's, undertaken in a consistent manner across England. This in turn allows for a systematic comparison of the benefits – that is the avoided damage – of different investment options and the economic justification of expenditure on flood defences as desired by advocates of neoliberalism in pursuit of economically efficient state operations. The emphasis on economic efficiency and justification of investments was an important driver for the development of NaFRA. A

[47] The formulation of these risk categories, in particular the establishment of the HQ75 threshold, was the outcome of negotiations between the government and the insurance industry. This will be discussed in greater length in chapter 6.

Defra senior official highlights the link between risk assessment and the economic evaluation of state operations:

> "because of the new risk information, we understood better what the risk actually is and what we need to invest collectively" (Defra 2008, interview).

In other words NaFRA allows Defra and EA not just to define but also to justify externally in economic terms their claims for flood defence funding. Indeed, a member of one of the Regional Flood Defence Committees associates the development and use of NaFRA with changes in the funding of flood defences and an associated strengthening of scrutiny over the efficient use of financial resources.

> "This [switch to HM Treasury central funding] brought with it a new accountability on the part of the Agency to Ministers and to Parliament. (...) The development of tools like NaFRA (...) made such a centralised approach easier to manage" (RFDC 2009, interview).

While the RFDC member's comment points to the usefulness of NaFRA for better monitoring and control over spending, it also highlights its benefits for holding operating authorities accountable for their actions. Officials at the EA recognise that NaFRA, by introducing consistent assessments of risks and the effects of state operations, allows for a better management of institutional risks to the Agency. As an officer notes in the aftermath of the 1998 and 2000 floods:

> "you had the reputation of the whole Agency at stake. So you cannot really have flood defence management done inconsistently across the whole country" (EA 2008a, interview).

Bye and Horner's 'lessons learned' report (1998) evaluated the performance and response of the Environment Agency as a single organisation during the Easter 1998 floods and criticised the variable risk assessments undertaken by the regional and local offices and defence committees of the EA. This illustrates how differences in the quality of mapping from one region to the next can affect the reputation of an organisation. Introducing a nationally consistent assessment instrument that standardises risk assessments for the nation eliminates grounds for contesting risk assessments and the decisions they inform based on inconsistent methodological choices. Moreover, as the

discussion of chapter 6 on the new Flood Map of the EA will demonstrate, nation-wide assessment instruments such as the Flood Map or NaFRA are also more easily defensible and auditable due to their standardised and proceduralised nature that shows that a certain standard of care was in general maintained (or not). The concerns about the defensibility of assessments and the reputation of the EA therefore reveal that the push for standardising risk assessments is not solely driven by a motivation to make state operations more efficient but also in response to the institutional risks faced by actors within England's flood regime.

### 5.3.2 Directing: Setting goals for protection and economic standards for state operations

NaFRA is an integral part of the DEFRA 'outcome measures' (DEFRA 2007) that form the regulatory core of England's infrastructure regime. DEFRA's 'outcome measures' depart from a simple setting of safety standards (as seen in Germany's flood defence domain) in that they refer to particular targets concerning risk reduction and the aggregate cost-efficiency of state operations in the flood defence domain.

The DEFRA outcome measures replaced the previous regulatory core set in the 1993 MAFF strategy. This MAFF strategy (1993b) included as a general objective of flood management:

> "to encourage the provision of adequate, technically, environmentally and economically sound and sustainable flood and coastal defence measures" (MAFF 1993b:4).

These broad principles were reflected in concrete goal-setting, through indicative safety standards (for instance, HQ100 standard for densely populated, urban areas), funding priorities (e.g. flood warning systems taking priority over new rural defences), and project appraisal guidance as reference points for directing investment decisions.

The core of this previous goal-setting was concerned with the 'economic soundness' of flood defence measures. More specifically, any proposed defence scheme needed to at least have a benefit-cost ratio (BCR)

of unity (1:1). The other components of the concrete goal-setting comprised guidance rather than prescription: *Indicative* standards served as assessment *aid* concerning the adequacy of defences (MAFF 1993:28) and a *secondary* decision criterion (Parker 2000a:234) whilst the national funding priorities '*assist* operating authorities in forward planning and establishing the relative importance of their schemes' (MAFF 1993:5).

In 2008,[48] the 'old' regulatory core centred on a benefit-cost ratio of unity was replaced by nine[49] outcome measures (OM). Two of these are particularly relevant for directing investment and management in the flood defence domain. First, OM-2 defines the objective of moving 145,000 households to a lower NaFRA probability category between 2008 and 2011 through investments into projects funded by the central government's Flood Defence Grants in Aid (FDGiA); of these 45,000 households should be transformed from properties in the high probability category (HQ75) to those belonging to moderate or lower risk categories. While this OM implicitly takes into account a particular protection threshold (e.g. HQ75) it does not define it as a largely uniform minimal protection threshold to be achieved across the country. This implies that measures can be applied selectively (depending on their cost and effectiveness) to achieve the desired outcome, and no particular protection level is being 'promised' as a uniform standard to be met in all cases, as in Germany's risk-based standard.

Secondly, the benefit-cost ratio is also part of the outcome measures (OM). While the benefit-cost ratio test was applied before the introduction of the outcome measures to the individual project level, OM-1 introduces an aggregate, nation-wide benefit-cost-ratio for total flood defence spending of 5:1. Individual projects continue having to achieve a BCR (now *significantly*) better than 1:1. The benefits in this calculation in turn are

[48] A first version of the outcome measures was made available for consultation in 2006.

[49] The outcome measures beyond those discussed in this section contain objectives concerning the relation of flood with wildlife sites (OM-4) and UK biodiversity habitats (OM-5), flood warning (OM-6), contingency planning (OM-7), inappropriate land-use (OM-8), and the production of flood management plans (OM-9).

calculated on the basis of NaFRA in terms of damage avoided. OM-1 therefore not only ensures that all *individual* projects have to be economically evaluated (1:1) but also that flood defence investments in aggregate pass a particular cost-efficiency threshold at a national level.

This focus on avoided damage and reduced risk to properties as the criteria for directing flood defence investment creates winners and losers. Due to the weight given to damage potential in allocation decisions spending is focused on built-up urban areas. Individuals and groups living in areas exposed to the same probability of inundation but with limited damage potential are forced to take responsibility for their own risk. This can happen since there is no key minimal level of state-provided protection which flood managers are to achieve.

Rural interests are among the most prominent losers from the more focused and risk-based allocation system introduced under the new OMs. The Country Land and Business Association (CLA), for instance, recently criticised the strategy of risk-based 'managed retreat' for coastal defences on the basis that concentrating resources on towns where the monetary damage potential is highest neglects strategic interests such as food security, and is irreversible (CLA 2010). As the agency responsible for implementing this strategy the EA faces pressure from aggrieved rural communities and their political representatives that are denied funding for flood defence schemes (Lane et al. 2011). The OM allocation mechanism provides a means of assuring due process in politically contentious spending decisions and fending off charges of political partisanship, bias or favouritism (Porter 1995). Moreover, Johnson and colleagues (2003:122-123) argue that the impact of rural lobbies such as the National Farmers Union on the changes of flood management since the Easter 1998 floods have been limited. This is because decreasing concerns over food security and the declining role of farming in England's economy have weakened the weight of agricultural interests in England's flood defence domain. In fact, the government's efficiency-oriented approach has found support among environmental

organisations (in particular the Wildlife Trusts, WWF-UK and English Nature) because it included a stronger emphasis on natural processes conducive to flood management (e.g. wetlands that retain water).

At the same time, the 'outcome measures' offer an instrument for managing the potential blame England's flood managers can attract if a flood occurs. Examples for the post-disaster public pressure on the EA are abundant: the Shadow Secretary of State for the Environment (the DETR opposite) noted in response to the publication of the Interim report by Bye and Horner that the EA showed an 'inadequate and failed response on the part of the Agency' (BBC News Online, 2 June 1998). In another example, residents of Worcester, a small city in western England flooded during the Easter 1998 floods, reported mismanagement of the EA in the operation of flood defences (BBC Online News, 14 April 1998). Finally, after the publication of the Bye and Horner report, all five Northamptonshire MPs demanded the resignation of Lord de Ramsay, then the chairman of the EA (BBC Online News, 2 Oct 1998). 'Outcome measures' can help responding to these pressures. This is because the 'outcome measures' demonstrate performance and effectiveness but do not promise protection to a specific level. This use is reflected in the comment by one senior policy officer of the Environment Agency:

> "Now [our approach] is about managing risk rather than offering safety. (...) It is not that we lower the number of properties that are at risk but rather that we manage more properties at risk. Because we are moving more to 'we cannot stop flooding'"(EA 2009a, interview).

'Lowering the number of properties at risk' implies that the government provides safety to these houses because fewer houses would be at risk from flooding. 'Managing the risk' on the contrary suggests that risk continues to be present, and can be associated with an implicit acknowledgement of the limitations of protection capacities ('we cannot stop flooding'). It implies that that a number of management measures are undertaken that make it less likely (but does not rule out) that floods will cause as much damage. As such, this concept of risk offers a justification for

failures to protect (it was not economical to protect this site so the funding went to a site with greater potential damage) while providing evidence that the EA has discharged its flood management responsibilities competently (proven by the number of houses in a lower risk category or, in the words of the EA officer, 'manage the risks to *more* properties'). This use of risk for blame avoidance has also been noticed by the national victims' organisation, the National Flood Forum (NFF). In the words of an NFF representative:

> "this [shift to risk-based flood defence management] is a well-thought-through idea because you can maintain a certain level of funding and strategic involvement but if something goes wrong, you can throw your hands into the air" (NFF 2009, interview).

The 'directing' in England's flood defence domain suggests that actors pursue the reduction of probable damage (properties at risk) in a cost-efficient manner (positive benefit-cost ratio), and thereby it directly takes a form compatible with neoliberal expectations. This economic orientation, however, implies differential treatment of groups in the society, which is politically unpopular with those left with less protection. Mechanical, OM-based rules for directing flood defence investment help to protect officials at the Environment Agency from charges of political bias or unfairness in its execution of the strategy chosen by elected ministers in the government of the day. At the same time, the tactic of defining risk reduction goals rather than safety standards is used as a means to control the extent to which flood managers can be blamed for failing to prevent damage, since such goals can be used to prove risk management performance without promising protection. Rather than simply serving as a means for 'trimming the state', risk-based directing also addresses the institutional risks associated with efficiency-oriented flood defence management.

### 5.3.3 Effecting: Allocating public money for security

As in the case of Germany the focus of this 'effecting' section will be on the funding of flood defences. The allocation of flood defence spending (historically at project level shaped strongly by cost-efficiency considerations) now includes a focus on performance and delivery in risk

reduction as well as cost-efficiency from a national perspective. This central government attention to performance and cost efficiency reflects the rise of central government funding for flood management.

Since the 1930 Land Drainage Act the central government has provided capital grants to finance flood defence construction. The complex system combined the Treasury's capital grants, local levies charged by local authorities and IDBs, and Revenue Support Grants from the Treasury to local authorities. In the funding period 2004/2005 however, funding primarily originated from the budget of the central government department of Defra and was channelled through the EA. Between 1996/97 and 2003/04 the annual average share of investment undertaken or at least controlled by local authorities stood at almost three-quarters of the total investment.[50] Between 2004/05 and the estimated figures for 2010/11 the local share has shrunk to less than 15% on average. The following figure 5 illustrates the evolution of funding more systematically, reflecting the switch from flood defence management drawing on resources largely controlled by local authorities to centrally funded spending, as well as highlighting the almost two-fold increase of total funding within the decade from 1997/98 to 2007/08.[51]

[50] The shift in funding is not a purely scalar shift from local to central. It is also an inter-departmental shift of responsibilities from Department of Communities and Local Government (DCLG) to Defra. This is because while local council tax and other local resources contributed to the local authorities' funding of flood defences, most of it originated from the funding through Revenue Support Grant (RSG) provided by DCLG. It still makes sense though to speak from a shift in control from local authorities to the central government's EA and Defra because the RSG is part of the general transfer of resources from central to local government whose local use is not prescribed by the central government.

[51] The figures in table 4-2 are nominal values, i.e. the inflation rate has not been taken into account. If it is taken into account the factor by which the funding is stepped up shrinks from 1.93 to 1.62 in the decade between 1997/98 and 2007/2008. This shows that the overall real trend is an expansion of funding for flood defences.

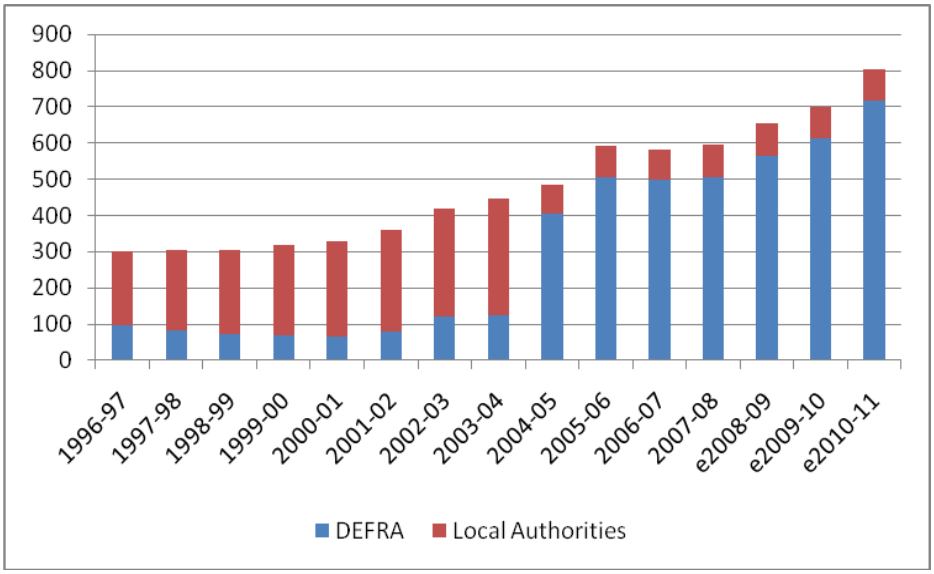


**Figure 5: Spending on flood management by government level, England**[52]

Such a rise in central government and overall funding contradicts neoliberal expectations about a roll-back of the state. While the roll-back expectation does not appear to fit England's flood defence domain a closer look at the allocation of the financial resources in flooding highlights the point that cost efficiency and economic performance are of great importance in England's investments into flood defences.

In fact, the increased provision of funding through the central government's Defra and the EA implied that the prioritisation tools of the central government gained increasing weight in allocating investments. Historically, as noted earlier, centrally provided resources were allocated through benefit-cost calculations, following the Project Appraisal Guidance (MAFF 1993a; MAFF 2001). In this guidance actors were advised to compare the costs of construction and maintenance of individual protective infrastructure schemes with the flood damage to be avoided during the

[52] This figure draws on data from spending overviews found on the DEFRA website (http://webarchive.nationalarchives.gov.uk/20081027092120/http:/www.defra.gov.uk/environ/fcd/policy/funding.htm, accessed on 10/09/2010). 2005/2006 sees a major rise because the Environment Agency was required to spend historic balances held by the flood defence committees (NAO 2007). The decline in 2006/2007 can partly be explained by the need for DEFRA to cut their budget in order to 'make up for losses from the failures in a new subsidy system for farmers' (BBC Online, 02/08/2006, see http://news.bbc.co.uk/2/hi/uk_news/ politics/5238342.stm, accessed on 20/6/2011)

design life of the proposed scheme. Proposed schemes were selected if in accordance to the 1:1 benefit-cost-ratio (BCR) that formed the regulatory core of the flood defence domain.

While individual projects were required to at least meet the unity BCR to be funded through central grants the allocation of the centrally provided and locally controlled funds was traditionally channelled through the decentralised Regional and Local Flood Defence Committees of the Environment Agency. The defence committees were composed of representatives of local governments representing local interests. The Royal Society for the Protection of the Birds (RSPB), for example, critically remarked that this implied a strong representation of local agricultural interests proposing major flood defence and land drainage schemes (RSPB 1998:7). Similarly, following the flood events in 1998 and 2000 the Parliamentary Select Committee on Agriculture remarked in its influential report on the Easter 1998 floods:

> "it is all too apparent that much local level decision-making is driven by short-term economic circumstance and localised priorities, rather than the long-term sustainable approach the Government is seeking. (...) [T]his culture will only be overcome if the Ministry adopts a more dirigiste role in guiding the efforts of operating authorities (...). In our opinion MAFF, collaborating with the Environment Agency, must strive to implement its national strategy in a more dynamic and proactive way" (SCA 1998:para.69-70).

The switch to centralised Flood Defence Grants in Aid (FDGiA) shifted the centre of control over funding allocation. A member of one of the EA's RFDCs notes that:

> "the decisions about how much money to spend in a given region used to be in the hands of local politicians [represented in the RFDCs]. (...) [However,] centralisation has undoubtedly taken place" (RFDC 2009, interview).

With this switch in 2004/2005 the economic orientation of the allocation mechanism was further refined. The overall spending of the central government has to achieve an aggregate national-level efficiency threshold of 5:1 complementing the efficiency evaluation at the local level. A pure focus on the aggregate benefit-cost ratio of 5:1 allows for a very

limited engagement of the central state in flood defence funding because the operating authorities and central government funders potentially only have to fund projects that ensure aggregate and individual compliance with the BCR thresholds.

Rather than focusing solely on the benefit-cost ratio and the value-for-money of state operations, state operations are required to achieve the risk management performance targets laid out in Outcome Measure 2 and are therefore also evaluated and selected in view of their contribution to achieving these targets. In contrast to pure cost efficiency targets such risk management targets compel the operating authorities to undertake a certain level of flood defence investments.

These cost-efficiency tests and evaluations in particular point to an orientation in the provision of flood defences that emphasises aggregate economic efficiency in the use of public resources, echoing the neoliberal desire to address economic inefficiencies of state operations. This orientation is even more conspicuous in policy documents and the perceptions of involved actors. Defra's new strategy, for instance, states:

> "expenditure will be focused so as to achieve *value for money* and will be prioritised to *deliver maximum benefits* in line with this strategy" (Defra 2005:15; *my emphasis*).

Defra also signed a so-called Public Service Agreement on Value for Money defining efficiency and cost-saving targets (DEFRA 2009). In this 2009 'delivery agreement' Defra promises that:

> "the Flood and Coastal Erosion Risk Management programme will *deliver savings* through improving the maintenance work stream and through the use of a *more risk-based approach* to maintenance, improved productivity and reduced unit costs" (ibid:4; *my emphasis*).

Equally the 'economics' of public investment is also stressed in the latest Environment Agency strategy from 2003 (EA 2003):

> "We need a new approach to the way we manage our [defence] assets that considers the whole life cycle of the flood defence system (...) to secure the greatest *return on investment*" (EA 2003:12; *my emphasis*).

This economic emphasis on value-for-money is recognised by the staff of operating authorities, including actors, such as the local authorities

and internal drainage boards (IDBs) that are involved in implementing flood defences at water bodies that are neither big nor critical enough to be assigned to the EA's remit. For instance, a member of an Internal Drainage Board emphasises:

> "The biggest issue with flood management is *economics*. The UK has this idea that it only has so much money to spend on flooding. Therefore, there has to be prioritisation" (IDB 2009, interview; *my emphasis*).

In combination with the shrinking share of locally controlled funding and the strengthening of the supervisory role of the EA in flood management in general since the Easter floods 1998, the economic orientation of England's effecting is embraced across all operating authorities. What is puzzling, however, about 'effecting' in England is that in spite of the strong cost-efficiency orientation the centralisation of funding had implications that are at odds with the more radical, neoliberal notion of 'state roll-back' (while still being reconcilable with the less radical ideas of a more economically efficient state). The centralisation of funding has in fact actually coincided with a continued rise of funding (see figure 4-2). In relation to *central* government funding it even implied a reversal of the decline in funding of the 1980s (Penning-Rowsell and Handmer 1988) and 1990s (from GBP 96.7 million in 1996/97 down to GBP 66.5 million in 2000-01).

This increase in spending is a result of different political pressures following the severe flood events in 1998 and 2000. The Select Committee of Agriculture (SCA) has in its influential report in the aftermath of the Easter 1998 floods noted that:

> "from the evidence we have received, it appears operating authorities are hard enough pressed as it is to maintain vital local flood and coastal defence programmes" (SCA 1998:para. 117).

The SCA therefore favourably views the government's 'plans to increase spending', and that the government 'has no plans to cut global levels of flood and coastal erosion expenditure' (ibid). This Parliamentary pressure can be understood as a response to the public pressure following the Easter floods in 1998. Intriguingly, political concerns about public anxiety about flooding also seem to influence the flood policy of the new UK

government of Conservatives and Liberal Democrats. Even though the coalition government was elected on the basis of a election campaign that stressed austerity and substantial budget cuts across all government departments the Prime Minister David Cameron felt the need to conceal the budget cuts imposed on Defra's flood defence spending by claiming that flood defence spending has been largely protected from cuts (Guardian, 24 November 2010).[53]

Moreover, another factor to consider is the more specific pressure by the insurance industry. Insurers, whose role will be discussed in greater detail in chapter 7, exercised pressure on the government by threatening to reconsider their then almost universal supply of affordable flood cover to households. In exchange for the commitment to provide flood cover the insurance industry asked for, among other demands, a substantial rise in central government funding for flood defences (Huber 2004). The effectiveness of this pressure is partly[54] confirmed by an interviewed Treasury official:

> "We have an interest in maintaining the Standard of Principle [the agreement between the Association of British Insurers and the government, KK] because otherwise the expectations that the government steps in rears its ugly head, and we don't want that because the costs would be significant. So we have an interest in doing some of the things the ABI was looking for" (HM Treasury 2009, interview).

The discussion of the organisation and role of risk in England's flood defence domain has shown that England's risk assessment instrument, NaFRA, offers England's flood managers the means to economically and comparatively evaluate flood defence measures. It has also shown that flood managers use NaFRA to define performance targets for cost-efficient risk reduction. While the economics of flood defence management is further

[53] David Cameron argues that the spending over the next four years will be similar (a modest 8% cut) to that over the past four years under New Labour. The problem is that flood defence spending had been rising significantly over the past four years so that if one compares the future spending under the new government with the 2010/2011 spending allocated under New Labour, the cut would be as high as 22%. See http://www.guardian.co.uk/environment/blog/2010/nov/24/flood-defence-cuts-facts-spin, accessed on 24/06/2011.

[54] The limitations to the insurers' influence will be discussed in chapter 7.

reinforced through the definition of an aggregate BCR as an issue of central importance to England's regime, this cost-efficiency focus is complemented by risk reduction targets. These targets along with the increase in funding contradict the simple, more radical 'retreat of the state' argument (while being compatible with neoliberal ideas of a more 'economical' state) and point to the political pressures on the government to protect the population. Risk instruments are in turn being used to manage these pressures by defining relatively flexible commitments to provide protection and demonstrate risk management performance.

## 5.4 REVISITING ARGUMENTS ABOUT NEOLIBERALISM IN THE FLOOD DEFENCE DOMAIN

This chapter reviews the domain of flood defence management in relation to neoliberal arguments around the 'rollback' and reconfiguration of the state and its use of the tool of the treasure. In order to address the problems associated with 'more state' – including costs, moral hazard and poor performance – neoliberalism's advocates would primarily expect to see comprehensive economic evaluation of the costs and benefits of state operations (relying on national risk assessments to determine the benefits of different flood defence schemes) as well as a declining governmental budget for flood defence management.

The flood defence domains in Germany and England cast doubts on neoliberal arguments about the significance of costs and economics as a primary driver of the choices by actors within the respective flood regimes. In neither case can a rollback of the state be observed even though the concept and instruments of risk are central components in the flood defence domains of Germany and England. Even introducing a stronger orientation towards economic efficiency faces specific barriers as the discussion of Germany shows.

Taking a closer look at each of the two country's cases, Germany's case offers a particularly strong contrast with the expected neoliberal regime

because of its commitment to providing an ambitious, standardised minimal level of protection to its population. While the financial resources for its implementation are abundant mostly in the aftermath of flood events, there is little indication of a systematic rollback of the state in terms of its commitment or mobilisation of financial resources for the protection of its population. The concept and instruments of risk, rather than serving to trim the state and making it more cost-conscious and efficient, are used to standardise protection levels, mostly to HQ100, and to define responsibilities between the state and the population and different levels of the Federal state. State-level governments normally aim at protecting the population against events that statistically occur as frequently as once every 100 years, while less frequent events are either to be managed by private individuals or through additional local government spending. In some cases lower protection goals are possible if the flood management and funding responsibility is shifted to the local authority. In Germany the concept and instruments of risk therefore make explicit what state actors at different government levels can be held accountable for and thereby facilitate intra-state co-ordination.

England's case resembles much more closely the expected neoliberal regime. The most visible deviation from the expected regime is the expansion of financial resources available for flood defences to the operating authorities. At the same time, the use of benefit-cost ratios at the project *and* national levels, as well as national performance targets based on the reduction of potential damage, fit well with neoliberal ideals of economically evaluated state operations. The centralised risk instrument NaFRA plays a crucial role in lending quantitative and formalised expression to this economic evaluation.

However, there appears to be some other motivation than just cutting costs and making individuals responsible in England's risk-based flood defence management. Such an explanation for the use of risk in this domain can also be reconciled with the actual expansion of the financial means for

flood defence management. The risk-based outcome measures promise that the state undertakes risk management (for which a consistently increasing amount of money has become available ever since the Easter floods 1998), but not that they provide a particular level of protection to the population. Both the increase in funding and the particular outcome measure can be used to manage institutional risks to flood managers in England (that is, manage the blame that is allocated after a flood occurs).

Costs and cost-cutting therefore do not seem to be the only or main concern of flood managers in Germany and England. Flood managers in the two countries also share concerns about meeting public expectations for protection in their flood management and how different actors can be held accountable for this. However the responses to this concern differ. In Germany state-level governments focus on providing a relatively ambitious level of minimum protection equally across the entire population. Such an ambitious protection level cannot necessarily be achieved however. This is because abundant resources for flood management mostly become available in the aftermath of major flood events whereas the absence of flooding can dry out the supply of money for flood management as the spikes and one-off patterns in funding after flood events and the scarcer resources before recent flood events illustrate. In England the approach differs. Rather than accommodating public expectations through defining ambitious safety standards flood managers do not provide any explicit protection level for which they can be held responsible. They accommodate expectations concerning the state's role in protection by demonstrating risk management performance.

Both strategies are controversial because state actors make implicit decisions about how important either the protection of different assets is (Germany's state-level actors define standardised safety objectives that imply protecting high economic value areas to the same extent as lower value areas) or the protection of different groups of the population is (England's flood managers concentrate on protecting higher-value areas).

As this summary discussion shows, the analysis of flood defence domains and their use of risk instruments does not only spell doubt upon the validity of arguments about the roll-back and reconfiguration of the state using treasure-based interventions. It also shows how the use of risk serves different purposes in the two countries. How can the choice of these different strategies be understood? Why does one country consider the economics in flood defence management so strongly but not the other?

## 5.5 EXPLAINING THE VARIATION IN RISK-BASED FLOOD DEFENCE MANAGEMENT

The arguments of neoliberalism's advocates about costs and moral hazards are not the dominant drivers of the organisation of the flood defence domains in the two countries and of the way in which key actors in the two countries' regimes use the concept and instruments of risk. Barriers to neoliberalism and alternative drivers of risk-based flood defence management are, however, not the same in Germany and England and this requires further exploration. The following sections discuss two contrasts between Germany's and England's institutional contexts that help explain differences in the two countries' divergent ways of organising their respective flood defence domains. The discussions will focus on the variance in the use of risk in the domains due to its assumed central role in the 'neoliberalisation' of flood defence management.

### 5.5.1 State structure: Fragmentation versus centralisation

The first factor that shapes the two countries' design and use of risk instruments is the state's structure in each case. Variation in the state structures of Germany and England has affected risk assessment and shaped the particular use and role of risk in their respective flood defence domains.

Germany's flood defence domain mirrors the fragmented responsibilities in the German Federal state (*Bundesstaat*). In the German *Bundesstaat* the Länder governments normally have at least a significant role in implementing legislation (implying a *functional* fragmentation between

the implementing Länder and the legislating Federal level), if not even in legislating. In water management the responsibility for the operational and legislative aspects of flood management are mostly situated at the level of the 16 German Länder, continuing a long tradition of decentralised competencies in environmental and water management (Fassbender 2007; Lees 2007).

This constitutionally, politically and historically entrenched fragmentation not only rules out centralised risk assessments ('detecting') that is instrumental for a systematic economic evaluation of state operations and much desired by many experts. An ICPR interviewee remarked that 'Federalism is rubbish for flood risk assessments' (ICPR 2008, interview). While this comment may also be tainted by the organisational interests of the ICPR (their Rhine-Atlas after all had to use a very coarse scale to avoid impinging on local responsibilities), insurers (see chapter 7) and some Länder experts (e.g. MUNLV 2008, LAWA 2008b, interviews) agreed that (especially in view of the transregional character of floods and their consequences) a less fragmented analysis could be beneficial for better co-ordinated flood management and improved flood insurance products.

The institutional fragmentation even marginalises the role of risk for some aspects of allocating funds ('effecting') for flood defence management due to the need for political compromises across different government levels. One illustrative outcome of a settlement between different levels of government is the use of the '*Königsberger Schlüssel'* to allocate joint GAK funding. Another example is the Länder-Federal '*Sondervermögen*' in the aftermath of the 2002 floods, where allocation of funding between different affected Länder and the respective proportions of the overall fund to be paid by Länder and Federal governments was the outcome of negotiations between the two levels.

Finally, the Federal fragmentation also highlights the value of risk-based safety standards as a means to achieve co-ordinated and equal protection goals ('directing') across the administrative boundaries of

individual Länder.[55] This is due to the abstraction from locally specific surroundings achieved by the use of the term HQ100.

England's flood defence domain has seen a significant concentration of responsibilities and resources at the central government's EA. In contrast to Germany's entrenched fragmentation such a centralisation does not face any significant institutional and political barriers within England's unitary state organisation with a concentration of power at the centre of the government (Knill and Lenschow 1998; Knill 1999). This state structure therefore facilitated the centralisation not only of risk assessment ('detecting') but also of the funding available for flood defence operations ('effecting'), both of which are important prerequisites for a cost-efficient implementation of flood defence operations.

Moreover, consistent calculations of risk across England are also perceived as a prerequisite for making defensible England's particular allocation of funding. This is, on the one hand, important because the funding does not aim for an equal protection level for the population. It is therefore no surprise that those disadvantaged by this allocation may challenge the underlying benefit and risk assessments. Standardising and centralising the process of risk assessment strengthens, following arguments by Porter (1995), the legitimacy of interventions on the basis of risk assessment. Porter also highlights that this improvement of legitimacy is particularly relevant for institutions with a weak legitimacy in contentious areas of intervention. Reflecting this need, the EA as a semi-autonomous organisation not *directly* legitimated by Parliament and increasingly

[55] Using alternative types of goals such as determining a maximum water volume per second flowing through a river channel might be useful locally, but of limited value as a reference point across states and Germany. Average water discharge measured in cubic metres per second at a particular gauge vary between and within different river catchments: The Rhine at Basel gauge stood at 1,060 m3/s while NRW's Sieg (Menden gauge) only had 52 m3/s. Average flood discharges along the Rhine also vary – e.g. at gauge Rheinfelden at the Upper Rhine the winter discharge stood at 2,220 m3/s compared to Cologne's 6,300 m3/s. This variation illustrates that a standard based on discharge volume would make standardisation across river catchments and regions impossible.

endowed with strategic and operational responsibility for flood management seems to be particularly sensitive towards risks to its reputation.

The defensibility is on the other hand important for blame deflection after a flood occurs. Again the EA has often been at the centre of attention for post-disaster blame assignment. For instance Johnson and colleagues (2003) observe after the Easter 1998 floods:

> "the failure of the Agency to warn people, accusations of mismanagement of the flood event, of poor maintenance and the condition of flood defence assets became key issues in the public debate in the media, among affected residents, and their action groups, and MPs" (ibid:48).

Risk management instruments in particular Defra's risk management performance targets (the Outcome Measures) can be of great importance to fend off attempts to shift the blame upon the EA because they limit what EA can be held accountable for and provide a rationale for the EA's flood management choices.

### 5.5.2 Norms and perceptions of statehood: Safety versus efficiency

The second factor concerns the norms and shared understanding of statehood underlying the attitudes of actors involved in flood and other risks' management. Variation in the perceptions and normative definitions of statehood shape to what extent the economic rationale underlying a neoliberal approach to flood defence management is being adopted by actors within the flood defence domain.

Germany's emphasis on providing safety to the population can be linked to a wider characterisation of the state as protective that is reflected in legal, normative and cognitive foundations of the flood defence domain. This emphasis can be found in the basic legal principles that inform flood management. Effective flood management is presented as a 'highest-order' public good of 'overriding significance' (Berendes 2005:202; Fassbender 2007:932) that is linked to the norm of the '*Wohl der Allgemeinheit*', that is the well-being of the population in general (LAWA 1995:2). More concretely water authorities are according to the HWSG's §31a WHG

obliged to manage as far as possible water bodies so that water discharge does not cause damage (‘*schadloser Wasserabfluss*’) and damage from flooding is also prevented. These legal principles are also reflected and made concrete in the aforementioned decisions by administrative law courts concerning the protection of the health and safety of the population (LAWA 2004). Legal and judicial manifestations of this image of a protective state also shape the attitudes and motivation of actors within Germany’s flood regime and overall political system. One example is the idea of *Daseinsvorsorge* through the state, i.e. ensuring the population’s safety from physical and financial harm. A senior official of Saxony’s Environment Ministry perceives:

> “a general duty for *Daseinsvorsorge* of state institutions vis-à-vis the population “(SMUL 2008, interview)

Moreover a local water manager in Dresden contrasts this duty of the state with perceptions of the role of the individual:

> “In Germany, the instruments to ensure more individual responsibility [*Eigenverantwortung*] are not really given. *Eigenverantwortung* is only discussed once it is recognised that the state can no longer provide safety. That means that individual responsibility is only for residual risk, not for all the risk” (Environment Authority Dresden 2008, interview).

Flood managers’ perceptions of the state’s responsibility for protecting the population echo core principles enshrined in Germany’s constitution, the *Grundgesetz*. One of the constitution’s basic principles is the so-called ‘*Sozialstaatsprinzip*’ (welfare state principle; Art. 20 GG). This implies not only a duty for the state to protect against social risks but more generally to safeguard the individual from the mishaps of life in order to provide each citizen with the foundations for a dignified existence (Schmidt 2008). While these principles are relatively broad, all legislative and administrative actions are bound by them and their interpretation through the judicial system. Ideas about the state’s responsibility and capacity for the protection of the population have also been associated with the continuing influence of a Hegelian state philosophy on Germany’s political and administrative systems (Weidner 1995).In this the state is perceived as being responsible

for and capable of managing virtually all areas of society and situated above private interests and therefore impartial towards all groups in society.

In view of this normative, legal and judicial environment actors choose HQ100 as key reference standard. This risk-based minimal standard firstly signals a significant degree of state protection, matching expectations vis-à-vis the self-portrayals of Germany's 'protective state'; and secondly it defines and operationalises impartiality by providing an abstract standard that can be applied regardless of the particular geography of a water body. Differentially treating different population groups based on damage potential is difficult to reconcile with the fact that state-provided safety is associated with the well-being of the population in general and abstract legal norms.

In contrast actors in England's flood regime stress the efficiency and value-for-money of state investments and operations. One of the roots of this economic orientation can be found in the evolution of flood management in England. England's flood managers operate in a *permissive* policy environment, i.e. the state has no *statutory* duty to intervene in a particular policy area. This is a result of the historical origins of flood management. Land drainage, the main concern of flood management from the 1930s to the 1970s, was one of the policy instruments at the disposal of MAFF 'in pursuing its overarching goal of modernising and expanding food production' (Scrase and Sheate 2005:131). These state interventions were justified in economic terms. More concretely water authorities have been using cost-benefit analysis to decide on allocating funds since the major East Coast flooding of 1953 (Waverley 1954). The long tradition of this method resulted in a taken-for-granted attitude of an economic evaluation of flood defence operations at project level within the operating authorities. In this context the EA's Chief Economist observes:

> "there may be some ideas already embedded within the organisation that are so fundamental that they may be hard to identify or articulate as being anything other than common sense or natural" (quoted in Scrase and Sheate 2005:118).

This tradition predates the proposed rise of neoliberal ideas in the late 1970s and 1980s. It has thus already created a conducive institutional environment for the importance of economic efficiency in England's flood defence domain and an economic evaluation of state operations reflected in the continued and expanded (to national level) presence of a BCR target.

However, the novel regulatory core of the domain, Defra's outcome measures also defines a particular performance goal concerning the reduction of flood risk to properties. The adoption of these national-level performance goals that define concrete outcomes (rather than just an economically efficient processes) can be understood as part of the rise of new approaches that inform government operations and procedures in England since the 1980s. In particular England's public management has been associated with 'new public management' (NPM) (Hood 1991) and a performance target culture (Bevan and Hood 2006). NPM has many facets but it most fundamentally reoriented public management operations from a process to an *outcome* focus and adopted a private sector management inspired (language of) economic rationalism including promoting market mechanisms, outsourcing, human resource management, performance measurements and more. Scholars (Hood 1991; Hood 1995; Pollitt and Bouckaert 2004; König 2006) have observed that the UK has been one of leading adopters of this new approach. The election of Blair's New Labour in 1997 reinforced the outcome orientation of government – introducing quantitative performance targets for example through the introduction of PSAs (Public Service Agreements) across all government departments from 1998 on for state operations and public services (Bevan and Hood 2006; Hood 2007).

More specifically the systematic and centralised nation-wide application of risk-based performance targets involves other actors within England's government, in particular Britain's economic and finance ministry, HM Treasury. The Treasury is of central importance in Britain's executive for managing public financial resources, shaping 'good practice in

the control of public resources' and ensuring ministerial 'accountability to Parliament' (Chapman 1997:164-165). Lee and Woodward remark that under New Labour it was:

> "decided to engineer an implementation process that would give the Treasury control not only over resources and inputs to policy, in terms of policy design and formulation, but also outputs, in terms of very detailed performance criteria and outcomes for service delivery" (Lee and Woodward 2002:51).

Departments such as DEFRA engage in a bidding competition with other departments over scarce resources. This implies the need to persuade the Treasury of the relative necessity and benefits of the measures and therefore to adopt arguments that are close to the objectives and professional culture of the Treasury.

The Treasury's general mission is to ensure sound public finances and to promote economic growth. For the Treasury this economic orientation directly points to a risk-based approach to steering and controlling public spending ever since the influential Hampton report from 2005 emphasised risk as an 'essential means of directing regulatory resources where they can have the maximum impact on outcomes' (Hampton 2005:4). A Defra official notes that a risk-based approach is indeed used to make the case for flood defence spending:

> "So when we go to the Treasury for the Spending Review, we can justify more easily why we need the money" (Defra 2008, interview).

A Treasury official involved with the DEFRA portfolio confirms the Treasury's endorsement of a risk-based approach for evaluating financing needs in flood management and beyond:

> "Across the government, we use a risk-based approach to regulation and especially with regard to investment, it is a very sensible way of doing things. It is good to see if you have deadweight in your programme and you spent money where it does not have to be spent. (...) If you have a set of goals and you have your performance matrix, and at the same time a limited amount of money, then a risk-based approach makes a lot of sense. To maximise those outcomes!" (HM Treasury 2009, interview).

## 5.6 CONCLUSIONS

This chapter started off with neoliberal arguments that pick up on the substantial expenditure required for flood defence construction and maintenance as well as the moral hazard associated with the collectively financed protection of individuals. Similar to discussions in social and welfare policy neoliberalism advocates demand 'less state' (or 'less inefficient states') in order to bring down costs and make individuals responsible. Following the debate in chapter 3 on the rise of risk-based governance it can be argued that the concept and instruments of risk can serve these neoliberal objectives by allowing the economic evaluation of state operations through the consistent quantitative calculation of avoided damage (which is equal to the *benefits* of the state's risk management operations).

The discussion of the cases of Germany and England raises doubts as to whether the proliferation of risk instruments and an increased reference to the concept of risk are part of a rollback or reconfiguration of the state, in particular as regards to its use of the government tool treasure. These doubts emerge because firstly, the budget for flood defences fails to confirm the expected decline for either of the two cases. Secondly, risk instruments in neoliberal settings are to be used to restrict state operations to those with the best value-for-tax-money. However for one of the cases, Germany, risk-based calculations of benefits (along with costs) of state operations play only a secondary role in goal-setting and investment into flood defence management. For the other case, England, the development and use of risk instruments can indeed be linked to close attention to costs and benefits of flood defence spending. However, England's operating authorities are also sensitive to institutional risks through the public response to failures to protect and to complaints about unfairness in differential protection – and make use of risk instruments to manage these challenges to the authorities' reputation and legitimacy.

Which factors are responsible for these deviations from neoliberal flood defence management in the two countries? In Germany, the key barrier to a neoliberalisation is the widely shared characterisation of the state as being responsible for protecting its population from harm. These foundations of the German state directly contradict the more limited description of the state's responsibilities from a neoliberal viewpoint. In addition, Germany's emphasis of equal protection reflects the norm of solidarity.[56] Public money is used to protect individuals (as long as they live in settlements) to a similar, minimal level, even though not all people and values might be protected due to lack of financial resources and political attention. Beyond these ideational and normative foundations of the state, the dynamics within Germany's fragmented Federal state interfere with risk-based neoliberalisation: political settlements between different levels of government disregard different risk levels and the Länder's resources and attempts to safeguard autonomy and control over risk assessment and management vis-à-vis the Federal government prevented a consistent and centralised calculation of risk. In short, Germany's case points to normative (protective state, solidarity) and structural (fragmented state) barriers to rolling back and reconfiguring the state. These barriers at the same time shape the particular use of risk in Germany's flood defence domain. Risk is used to define and delineate Germany's protective 'security state' by defining the statistical events for which (different parts of) the state can be held accountable in terms of the provision of protection and determine an ambitious protection standard sufficiently abstract and well-established to inform flood defence management across a fragmented Federal State.

England's case reinforces arguments about the aforementioned barriers by showing how the opposite features to Germany's case work in favour of neoliberalisation: England's state structure ensures a power and resource concentration at central government level, allowing for consistent

[56] This norm of solidarity will be even more visible in the discussion of Germany's disaster financing where significant private donations and public disaster aid became available after more recent flood events at the Elbe (2002) and Odra (1997).

and centralised risk assessments that are important for a systematic, nation-wide economic evaluation of state operations. Norms of individual responsibility (which will be discussed more extensively in chapter 7 on insurance), the rise of public sector management approaches leaning on efficiency-oriented private sector models and a long tradition of benefit-cost calculus in water engineering create a conducive ideational context for regime domain oriented towards economic efficiency.

At the same time however, structural factors as well as the selective state involvement in the management of flood risks exacerbate institutional risks to key actors – in particular the EA – within the flood defence domain. A selective rather than comprehensive state involvement carries the risk of policy failure (that a flood occurs and causes damage) and complaints about unfair treatment (since residents of areas with lower damage potential are less protected). The need to manage these institutional risks explain – along with the pressure of the insurers[57] – why the funding for flood defences has been on the rise as well as some of the particular features of risk assessment (consistency) and management instruments (no commitment to a particular minimal *safety* level but measurable *risk management* targets). These institutional risks are exacerbated by the fact that responsibility for the flood defence domain has become increasingly concentrated on the EA, rendering the semi-autonomous agency EA the first addressee of complaints and blame games.

Dismantling or introducing an economic rationality into the 'security state' is therefore not as straightforward as neoliberalism's advocates may expect in view of the high (and expected to rise) costs of flood defences and strong indications that human behaviour has contributed to the increased damage from flood events. The 'security state' can be as institutionally entrenched as in Germany, resulting in a very different pattern of use of risk in the flood defence domain. Or the institutional risk, partly associated with

[57] The reasons why the insurance industry is a particularly important interest group will be elaborated in Chapter 7.

a neoliberal, economic orientation of England's flood defence management, compels actors to use risk for defensive purposes as seen in England.

## CHAPTER 6: LAND USE, BETTER REGULATION AND ISSUES OF CONTROL

The management of land use is concerned with the use of the government tool of regulation. Regulations are mostly sets of formal rules that – based on the legal authority of the state – establish restrictions on certain types of individual and organisational behaviour. Within any flood regime such regulations may include interventions from an outright ban on the use of land at flood risk to restrictions on particular land uses to requirements to render uses better adapted to flooding.

In contrast to the 'treasure' tool, regulation is widely seen as becoming an ever more important tool in the government's tool box. As noted in chapter 3, the '*regulatory* state' in Europe (e.g. Majone 1994) replaces the financially and politically exhausted post-war state that was characterised by substantial financial interventions into the economy (Keynesian 'deficit spending') and state ownership at the company level. While the 'regulatory state' is sometimes seen as a solution to the costs and failures of the post-war state, another viewpoint on the rise of regulation is more critical, in particular due to enforcement failures and the costs of an ever-growing number of regulations ('regulatory creep') to the economy (e.g. Stewart 1983). The critics of regulation do not exclusively insist on 'less regulation' but on different types of regulation – more specifically 'better regulation' or 'smart regulation' (Gunningham et al. 1998; EC 2001; Mandelkern-Group 2001; Baldwin 2005; BRTF 2005).

Using the concept and instruments of risk is one option among others (including Regulatory Impact Assessments) to accomplish better regulation. Restrictiveness of rules and their enforcement can be varied in accordance with levels of risk in risk-based regulation, implying a better targeting of regulation that increases the effectiveness of the state's limited enforcement resources and avoids excessive burdening of regulatees (Hutter 2005; Rothstein, Irving, Walden et al. 2006b). Risk-based approaches have for instance been used in contaminated land clean-ups in the US and UK,

resulting in different degrees of detail of risk assessments (Rothstein et al 2006). Such approaches have also been used by the UK's Financial Services Authority (FSA) through its ARROW tool – identifying, among other issues, the risks particular financial institutions constitute to achieving FSA objectives in the process of tailoring, monitoring and regulating these institutions in accordance to risk levels (Black 2005).

Are these concerns about regulation relevant for the discussion of flood regimes – in particular the regime domain land-use regulation? Given the economic trade-offs involved in regulating the use of floodplains and other areas exposed to flooding (between permitting development so as to encourage economic growth and restricting land use that would increase the consequences or frequency of flooding), questions of better targeting regulations to avoid overburdening private property developers and regulators are potentially of great importance. Has this regulatory domain come under scrutiny? Is there a discernible trend towards 'better regulation'?

The proliferation of risk instruments in the land-use and planning domain can be interpreted as one indication of an interest in 'better regulation'. Planning authorities and regulatory initiatives from the planning domain have, for instance, been driving the development of flood risk maps that outline different flood zones in Germany and England. They have done this mostly by requiring the responsible authorities to provide flood maps and define particular flood zones for regulation (e.g. Germany's 'inundation areas' and England's three flood zones) (DETR 2001; LAWA 2004). But are instruments and the concept of 'risk' really used to improve regulation – for example by allowing an improved targeting and regulatory differentiation on the basis of risk instruments? If not what factors may explain the particular risk-based organisation of the regime domain of land-use regulation in Germany and England respectively?

This chapter begins with a discussion of the manifestations of regulatory failures and the particular challenges in the land-use domain. It explores how the concept and instruments of risk could potentially be used

to improve the performance of land-use regulators. The following section analyses the organisation of the land-use domain in the two countries and the role of risk therein. Next it will be explored and explained whether and why the use of risk could be linked to the needs to 'better' the regulatory state. The issue of how the use of risk is in fact driven by concerns about varying institutional risks and shaped by the particular institutional context in the two countries will be discussed as an alternative motivation for the use of risk in this domain.

### 6.1 LAND USE UNDER PRESSURE

The basic logic underlying land-use regulation is simple. In the words of the influential guidance of Germany's Interstate Working Group Water (LAWA) group:

> "if land at risk of flooding is not being used, there will be no or limited damage." (LAWA 2004:13).

As seen in the previous chapter flood defences fail to provide absolute protection. Regulation appears as an effective alternative means to reduce damage from flooding since it offers a means to control the accumulation of values on land at risk from flooding that would otherwise require protection. It also prevents land uses in one place (i.e. draining wetlands and retention zones) that might increase the frequency of flooding in others. It is therefore not surprising that LAWA assigns a 'special importance to precautionary spatial planning' (ibid). Similarly England's Environment Agency (EA) notes that:

> "regulating and influencing development [is] essential in the battle against increasing flood risk" (EA 2003:8).

The increased attention paid to land-use regulation in both countries reflects insights that encroachment of floodplains has contributed significantly to the damage resulting from recent flood events. In England for instance the autumn 2000 floods damaged about 10,000 properties; the flooding in summer 2007 damaged approximately 55,000 properties (EA 2001; Pitt 2008). Germany's Elbe 2002 floods damaged about 25,000

households in addition to the historic centres of Dresden and smaller Saxonian cities as well as transport infrastructure and industrial sites in Saxony (MunichRe 2003). Barredo points to the growing number of years in which floods caused very high damage in the 1990s and 2000s:

> "The causes of the increasing flood disaster damage in the last few years would have to be sought mainly in the socio-economic and territorial domain (e.g. land use, new developments) [rather than changes in the climatic system]" (2007:144).

The encroachment of areas at flood risk is partly driven by the particular benefits associated with the use of areas at risk: for example fertile agricultural land, access to fresh water and transport, and the amenity of living near a river or coastline. It is partly a result of social change and the associated need for more space for housing. Moreover – as noted in the previous chapter – the accumulation of values in floodplains also resulted from the traditional approach to flood management, i.e. the protection of values through structural flood defences. Parker (1995) drawing on earlier research on the so-called 'levee effect' from U.S. scholars (White 1945; White et al. 1958) describes the renamed 'escalator effect' where:

> "progressively higher levels of structural defences [that] are constructed to protect against increasing flood damage potential, which is mainly caused by post-defence development of floodplains" (Parker 1995:343).

In other words, flood defences on the one hand convey a sense of safety which prevents current and prospective property owners from taking flooding into consideration (thus leaving them unprepared for larger flood events and ill-adapted even for smaller ones). On the other hand especially where investment into flood defences is linked to damage potential (e.g. through cost–benefit assessments) the 'escalating' dynamics between flood defences and development may increase the potential damages from flooding as flood defences may fail or be overtopped.

Two challenges for actors in charge of land-use regulation can therefore be identified in the land-use domain. The first challenge is to

ensure that regulation is in place to control the accumulation of values on land at risk. Once regulation controls the accumulation of values in areas at flood risk, flood defences, at least for new developments, will in principle become redundant. This points to the shift from a state that provides security through flood defences to a 'regulatory state' that enables and steers rather than delivering services directly – echoing the 'rise of the regulatory state' (instead of an infrastructure-owning state) argument.

The second challenge is the design of land-use regulation in view of the benefits of land use to society. These benefits are reflected in multiple goals that actors in charge of general land-use regulation pursue. England and Germany's planning systems have endorsed 'sustainable development' of land as the core principle of their planning (DCLG 2007b; ARGEBAU 2008). Germany's planners are required to ensure a 'balanced land use' (*ausgewogene Gesamtnutzung*) that reflects a 'reasoned co-ordination of different types of land use' (ELLA 2006:40-41) – taking into account different spatial functions (such as nature, landscape and climate) and spatial uses (such as development, recreation and farming). In England the competing objectives and the need for co-ordination are presented through the existence of 25 guidance notes that contain national planning policy objectives (the so-called Planning Policy Guidance notes or statements, PPG/PPS) – including ones specifically outlining guidance to ensure that the planning system is sensitive to the government's strategic goals for housing (Planning Policy Guidance PPG-3), transport (PPG-13), renewable energy (PPG-22), as well as flooding (PPS-25) and coastal planning (PPG-20). These guidance notes are necessary to ensure that regulations concerning flooding do not come at the expense of other goals. Pottier and colleagues, for instance, point to the potential costs of regulating:

> "A strictly economic argument is that flood risk management should aim to maximise the performance of the whole catchment and not to minimise flood losses. This may, in some cases, be best achieved by developing floodplains, since improved efficiency of catchment use can

> outweigh both increasing average annual flood losses and higher flood alleviation costs" (2005:3).

From an economic perspective, a strongly precautionary approach to regulating floodplain use would therefore potentially imply welfare or utility losses (due to unexploited land). Such losses could, however, be mitigated by a more targeted approach to regulation that balanced the risks and benefits of different land uses.

How do the concepts and instruments of risk help in meeting the needs of precaution and balancing these needs with those of utility? In the land-use domain calculations of risk have mostly been used to produce flood maps. As noted in chapter 2, flood maps (at least) display the distributions of water over land for flood events of varying probabilities and thereby provide insights into how likely it is that a particular piece of land will be inundated.

From the perspective(s) of the 'regulatory state', risk can therefore be instrumental to defining the nature and scope of land use regulation and make it better. By identifying the areas that are at risk, risk instruments potentially define the spatial boundaries of the regulatory state. With regulations in place the construction of flood defences in principle becomes, at least in relation to those areas that have not yet been fully developed, redundant. By determining zones that flood with different frequencies and/or consequences the restrictiveness and extensiveness of regulations can be tailored – for example by only allowing flood-adapted buildings in areas with a high likelihood of being flooded and lighter regulations for areas where fewer floods can be expected. This risk-based regulation would therefore allow some economic exploitation of areas at risk, thereby avoiding a precautionary overregulation of the economy.

But are the emerging regulatory approaches in Germany and England formed by concerns about pre-empting the need for costly and ineffective infrastructure measures and by fears about the regulatory stifling of economic activities on floodplains? To what extent is it possible to speak of risk-based regulation within flood regimes? The following two sections (5.2

and 5.3) explore the forms and the concepts that instruments of risk encapsulate and the roles they play in the land-use domain of Germany and England's flood regimes.

## 6.2 EXAMINING RISK IN GERMANY'S LAND-USE REGULATION

The regulation of land use is managed through Germany's general planning system. Individual planning decisions, i.e. whether to allow the construction of a particular building, the *Baugenehmigungen*, and local plans, i.e. which areas to open for development, the *Bauleitpläne*, are taken by local planning authorities that hold the general competency over planning decisions, the *Planungshoheit*.

However, local planners are bound by Federal and Länder planning legislation – such as the Federal Spatial Planning Act (*Raumordnungsgesetz*, ROG) – and are required to align their decisions with the codified objectives and binding plans defined with increasing details from mostly Landes (for example the *Landesraumentwicklungsplan Sachsen*) to regional levels (for instance the *Gebietsentwicklungsplan* or *Regionalplan Düsseldorf*). Moreover, local planners face further constraints in their *Planungshoheit* where planning issues are relevant for managing floods. Central norms and instruments relevant for these special planning issues have been introduced through revisions of the Water Management Act (WHG)[58] in the context of the Flood Control Act (HWSG)[59] from 2005 as well as recent Länder water acts, rather than in general planning legislation such as the ROG. In the case of the HWSG, the responsible Ministries of Environment (BMU) and Spatial Planning and Construction (BMVBS) decided that:

[58] The original version of the WHG from 1957 required Lander to identify 'inundation areas' only if it deemed them necessary for regulating run-off (no reference to reducing flooding). The revision of the WHG of 1996 emphasised that regulation of run-off should not imply faster and higher floods (e.g. a consequence of narrower river channels due to defences) but that the regulation of 'inundation areas' should contribute to preventing and reducing flooding.

[59] The HWSG is a so-called 'Artikel-Gesetz'. This implies that relevant norms and rules from different Acts are pulled together under the header of HWSG. Table 9 provides an overview of the elements. It is important to note that the component Acts of the HWSG existed earlier, but that in the course of producing the HWSG they were revised.

> "specialist requirements for development [on floodplains] are to be regulated within specialist legislation" (Berendes 2005:Fn 20).

The revised WHG in the HWSG contains the regulatory core of the land-use management domain of Germany's flood regime with directly binding effects on all levels of the planning system. Table 9 provides a brief overview of the particular nature and contents of the HWSG, highlighting the central importance of the WHG for land-use regulation (see the **bold print**).

| Components | Content |
|---|---|
| *Wasserhaushaltsgesetz* (WHG) – Water Resources/Management Act | • General principles of flood management, in particular **safeguarding areas at risk from flooding and relevant for the management of flooding**, as well as a general obligation for precautionary and damage-reducing behaviour (§31a)<br>• **Flood management in *'Überschwemmungsgebieten'* (USGs- inundation areas) (§31b):**<br>▪ **Definition and legal publication of 'inundation area'**<br>▪ **Specific regulations, including no oil heating and rules of farming**<br>▪ **Specific regulations concerning development/construction, i.e. the ban on development planning (unless 9 conditions are met)**<br>• **Flood management in the *überschwemmungsgefährdeten Gebieten'* (flood-prone areas) (§31c):**<br>▪ **Definition and cartographic publication of areas**<br>▪ **General rule to prevent/reduce significant damage to public good**<br>• Production of flood management plans (§ 31d)<br>• Cooperating along catchments (§ 32) |
| *Baugesetzbuch* (BauGB) – Construction Code | • **Integration of USGs and flood-prone areas in local development plans (*Bauleitpläne*) (§§ 5, 9)**<br>• **Flood management as public concern (*öffentlicher Belang*) (§35)** |

| Components (continued) | Content |
|---|---|
| *Raumordnungsgesetz* (ROG) – Spatial Planning Act | • **Spatial aspects of flood management to be safeguarded through goals and principles of spatial planning (§7)** |
| *Bundeswasserstrassengesetz* (WaStrG) – Federal Waterways Act | • Waterway training/construction/maintenance must not have adverse consequences on flood management (§§8, 12)<br>• Federal navigational forecasting to be co-ordinated with Länder-level flood forecasting on waterways (§35) |
| *Gesetz über den Deutschen Wetterdient* (DWD-G) – Act concerning German Meteorological Office (DWD) | • Weather forecasting explicitly to be used for purposes of precautionary flood management (§4) |

**Table 9: Germany's Flood Control Act and its components**

Note: **Bold** print for norms in relation to planning

The discussion of Germany's land-use domain in the following sections therefore focuses on the regulations found in the specialist flood management domain. As the following discussions will show, the WHG's 'inundation areas' constitute the central spatial category in Germany's land-use domain. In general planning the ROG has (since 1998) explicitly defined 'precautionary flood management' as a task for the general spatial planning system. This is achieved through Landes legislation (MKRO 2000) and draws on a range of specific planning tools to preserve and recover retention areas and protect those areas at flood risk. However these regulations primarily assume a serving role in the land-use domain of Germany's flood regimes to the regulations and legal categories developed by the 'specialist planners' of water authorities (in particular the USGs) (MWME 2008, interview).

### 6.2.1 Detecting: Advances in flood mapping

In general, detecting in the land-use domain is mostly concerned with the assessment of spatial aspects of flooding – namely the distribution of water

quantities inundating land outside the river channel with varying statistical frequencies. An additional concern for 'detecting' might be the vulnerability of those values exposed to the hazard of flooding.

As in Germany's flood defence domain, detecting for land-use regulation is largely in the hands of Länder authorities – mostly the Länder's environment agencies. What is notable however is that there is a specific, narrow convergence in flood mapping – namely around the mapping of HQ100 flood zones – and that the protection afforded by flood defences are taken into account when defining the boundaries of those flood zones. Moreover, there is no systematic consideration of the vulnerability of different values in the detecting. These aspects are notable because first, they contrast with England's approach, and, second, they give a first illustration of the narrow and complementary nature of Germany's regulatory state.

The first systematic attempts at flood mapping date back to the first decade of the 20th century, when Prussian water authorities produced a set of maps identifying inundation areas for the Rhine based on a historical flood event from 1890. However these maps referred to a single historical event only, and were not updated to take into account the engineered changes to the Rhine river channel of the 20th century. After the floods in 1993 and 1995 however, flood mapping took off – with a pioneering role for the aforementioned Rhine-Atlas. The Rhine-Atlas identifies three flood zones with different probabilities, namely with HQ10 and HQ100 as well as one zone that would be affected by an extreme event (generally based on a historical flood event individually chosen by the ICPR's member states and Länder).

The pioneering work for the 'Rhine-Atlas' also shaped subsequent mapping across Germany's Länder. The Land with perhaps the most advanced flood mapping programme is Saxony. Constructed in the aftermath of the Elbe floods of 2002, Saxonian maps identify five different zones for flood events with different probabilities (HQ20, 50, 100, 200/300 and extreme); they also consider additional factors in the categorisation of flood

zones (velocity and depth of inundation). Other Länder with advanced mapping programmes (in particular Saxony-Anhalt, Baden-Wurttemberg, Rhineland-Palatine) make similar differentiations, sometimes taking further factors such as depth and velocity into account, and sometimes determining the probability of inundation only (LAWA 2006:16). This results in a varied landscape of risk maps across Germany.

By establishing a statutory duty for flood mapping the Flood Control Act (HWSG) from 2005 consolidated and harmonised flood mapping across Germany, making advances in the production of flood maps less dependent on 'management by accident' and expert-led initiatives (see previous Chapter 5 on the origins of the Rhine-Atlas and Saxony's *Hochwasserschutzkonzepte*). The HWSG defines a minimal, uniform and binding standard for flood mapping. It compels the Länder to identify, formally determine ('*förmlich festsetzen'*) and publicise 'inundation areas' ('*Überschwemmungsgebiete*', USGs) with HQ100 boundaries until May 2012.[60] In addition to HQ100 as a reference point the maps draw boundaries taking into account the effects of flood defences on the distribution of water over land. In fact the legal definition of USGs first refers to areas between the river channel and the flood defences as 'inundation areas'; this is followed by the probabilistic definition to capture areas not protected to the HQ100 standard. As will be discussed below, this aspect of taking into account flood defences in flood mapping reveals a distinct contrast with England's case, and is important to understand the role of regulation in Germany's flood regime.

Given the association of USGs with tight regulations on land use (see next section on 'directing'), the process of mapping USGs can be contentious and subject to challenges from aggrieved interest groups. An expert from a state-level Environment Agency notes that:

[60] Even if the process of formal determination has not been concluded, Lander are obliged to 'provisionally secure' (*vorläufig sichern*) and apply the regulations to inundation areas (WHG §31b, 3 and 4).

> "some of the people living in or near of a potential USG just submit an objection and ask things like 'why have you only been using 1-dimensional models to calculate this as you could potentially also do 2-dimensional calculations?' So in these cases, you need to have a justification why you chose the simpler method. I mean the reasons are often convincing enough but still, you better be prepared" (LANUV 2009, interview).

Such challenges may result in a judicial review of the intervention through the public law courts (*Verwaltungsgerichte*). Experts are therefore under pressure to take legal reasoning and reviews into account when determining USGs. Concretely this means that USGs are identified in accordance with a widely accepted technical norm (*allgemein anerkannte Regel der Technik*). Such norms require that a chosen method and process has been recognised as accurate in theory, is widely used in practice by experts, and its practice has demonstrated its adequacy.

Beyond the HQ100 'inundation areas' (USGs) the HWSG does little to harmonise flood mapping across Germany even though the Act also obliges Länder to map (though not formally determine) 'flood-prone areas' ('*überschwemmungsgefährdete Gebiete*'). This type of area is, however, not precisely specified in probabilistic terms within the Federal Act. Rather the 'flood-prone zones' are loosely defined as areas in which inundation results in adverse effects on the public good (*Beeinträchtigung des Wohls der Allgemeinheit*) and that are not part of the USGs. This definition of 'flood-prone' areas explicitly includes those inundated when defences fail or are overtopped.

According to the HWSG this definition of 'flood-prone areas' requires elaboration through the Länder governments. The practice in the Länder, however, shows the limited significance assigned to this mapping zone: North Rhine-Westphalia's Landes Water Act (*Landeswassergesetz*, LWG) simply adopts the (non-)definition from the WHG (see LWG §114a). In Saxony, 'flood-prone areas' have yet to be integrated into the Saxonian Water Act at all (*Sächsisches Wassergesetz*, SächsWG). Another example is

Sachsen-Anhalt, also strongly affected by the Elbe 2002 floods, whose water act (*Wassergesetz für Sachsen-Anhalt*, WG LSA §98b) proposes as a reference flood the highest recorded flood event as long as it is less likely than HQ100. Risk assessments in relation to flood-prone areas therefore remain underspecified both at the Federal and state level. 'Flood-prone areas' are therefore a spatial category with limited relevance for flood mapping and thus (as we will see in the next section on directing), also for land use regulation. The reasons for this will be elaborated in the following sections because it is the formalised, regulatory category of 'flood-prone' area that is perceived as difficult to convert into concrete administrative practice.

The 'detecting' discussion raises some interesting questions about the particular form and role of regulatory statehood in Germany's land-use domain. Most importantly the flood maps that are relevant as informational foundations for regulation point to a narrow and binary nature of the regulatory state. While the flood maps display a set of flood zone boundaries (such as the five boundaries of Saxony's flood maps, HQ20, 50, 100, 200/300, and extreme), the key difference is between 'inundation areas' of HQ100 and those areas beyond the HQ100. As the discussions on directing and effecting will show, only 'inundation areas' really matter for behaviour regulation.

This 'detecting' casts doubts upon the adoption of 'better regulation' in Germany's land-use domain as well as more generally on the role of regulation within Germany's flood regime. For the former the use of several flood zones to achieve more targeted regulation would have been expected. For the latter it can be asked to what extent flood zoning and associated regulations help in dealing with the key challenge to flood management – namely the increasing damage potential as a result of economic and social activities in areas at risk. The problems of a lack of flood awareness and the 'escalator effect', key contributors to rising damage potential, are only addressed in a limited manner – namely for 'inundation areas' unprotected

by defences. Behind flood defences flood zones have limited regulatory implications. This weakens the potential contributions of flood maps and land-use regulations to improve flood awareness and to control the escalator effect because it suggests that there are not only risky areas but also safe ones behind defences.

Finally another notable aspect of Germany's regulatory state is that reviews by public law courts shape the actors' assessment of risk in the land-use domain highlighting the fact that, as already visible in the discussion of the regime domain of flood defences, the judicial system is important for actors within Germany's flood regime.

### 6.2.2 Directing: Defining restrictions on land use

Directing in the land-use domain is primarily about defining restrictions on the use of land at risk from flooding in order to halt the growth of (or even reduce) the potential damage from flood events. To this end 'directing' means defining the boundaries of flood zones (see 'detecting' section) and determining which rules are applied to land uses in these flood zones. In Germany the key regulatory concept in the land-use domain is the 'inundation area', which is subject to stringent rules on land use (a *de facto* ban on further developments). Beyond USGs however, Germany's regulatory state loses its teeth. This reiterates and elaborates on aspects of the 'detecting' discussion which pointed to a limited regulatory state within the boundaries of HQ100.

The 'inundation area' and associated regulations were the central part of the general overhaul of Germany's flood regime in the aftermath of the Elbe 2002 floods – especially in the form of the HWSG from 2005. Federal restrictions are tight for USGs. Particularly, local planners cannot formally generate any new development plans for an 'inundation area' unless they meet nine stringent conditions *cumulatively* (most notably the lack of alternative space, close proximity to existing developed areas, avoidance of damage for HQ100 events and of danger to human lives, and having no

adverse consequence for the run-off of water and existing protection level/flood management measures). Individual development proposals within 'inundation areas' (complying with development plans devised before the new regulations took effect) need approval by water authorities (§31b.4 WHG). The water authority determines whether a development to be constructed in a flood-resilient way adversely affects water retention, run-off, and flood management measures – and if it does, whether the adverse effects are appropriately mitigated, for example by adding water retention space elsewhere.

While the previous Federal water management law an earlier version of the WHG from 1996, had already introduced the legal category of 'inundation areas' also, the legal category in the revised WHG from 2005 differ in several aspects. First, they define uniformly and clearly the concept of 'inundation area' through its quantification as HQ100. Second, they are linked to a concrete set of restrictive regulations and criteria for exemptions. Third, the new regulations are immediately effective. In contrast earlier versions (1957, 1996) of the WHG required the Länder legislators and governments to determine the regulation of land use and identification of 'inundation areas', but without a concrete deadline or probabilistic specification of 'inundation areas'. Federal lawmakers perceived this procedural and conceptual tightening as important because the regulatory failure in land-use control was seen as a failure of the Länder to make use of existing Federal framework legislation. As Germany's Expert Advisory Council for the Environment (*Rat der Sachverständigen für Umweltfragen*, RSU) remarked in 2000:

> "the problems of flood management can rather be found in the fact that the Länder do not make use of and animate the framework [for regulating and managing flooding] that the revised Federal WHG [from 1996] provides them with" (RSU 2000, quoted in Fassbender 2007:927).

With more detailed prescriptions, clear deadlines for introducing the new legislation at Länder level, and unified legal concepts, the Federal level

hoped to impose ‘a uniform standard across the whole country for land-use restrictions’ (LANUV 2009, interview). This standard-setting was to eliminate ‘loopholes’ for the implementing Länder rather than because it was perceived as necessary from a flood-management expert’s perspective (Berendes 2005). Berendes notes, however, that one loophole remained – namely that ‘inundation areas’ only have to be declared if ‘not insignificant damage’ (*nicht nur geringfügiger Schaden*) is expected. This loophole was narrowed down by the obligation to inform the public about the process of determining inundation areas. This in turn, as an expert of NRW’s Environment Agency observed, mobilised environmental NGOs that put pressure on the state actors to restrict land use – mostly in order to preserve the greatest possible area of floodplains for natural water retention (LANUV 2009, interview).

Not just the Länder level felt constrained in their planning discretion by such detailed and prescriptive regulations at the Federal level. Local councils – organised through the so-called *Städte*- and *Kreistage* – sought to prevent restrictive and binding regulations (BMU 2008, interview). Similarly economic interest groups also had issues with the restrictive regulations. The DIHK (the German Chamber of Commerce and Industry) however, was opposed to the ban on developments in inundation areas (DIHK 2002). Other groups had more specific issues with the draft proposal of the BMU. The DBV (Germany’s farmer interest group) challenged the restrictive regulations of farming practices (prohibition of crop farming (*Ackerbauverbot*) in inundation areas) (DBV 2004). The BDI (the German Industry Association) focused on preventing too-strict regulation for the storage of water-polluting substances in inundation areas (see BUND 2005). Officials of the involved Federal ministries (BMU 2008; BMVBS 2008, interviews), however, point out that in the course of the Federal law-making process such groups failed to make a deep impression on the legislative process in the land-use domain. Tight restrictions on land use within HQ100 were nevertheless adopted (with the exception of the farming lobby that

managed to significantly water down the restriction on farming), and the stricter vision on land use regulation by the BMU (in particular the ban on development plans for inundation areas) prevailed throughout most of the legislative process (Berendes 2005).

An official of the BMU argues that the HWSG had strong support from the then Chancellor Schröder, and was seen as a key legislative initiative by the Federal Minister of the Environment Jürgen Trittin, thus contributing to the political momentum created by the devastating 2002 floods (BMU 2008, interview). In addition to the strong support of key actors within the Federal government Länder and local councils also recognised how unpopular it was to oppose tighter regulation of land use in the aftermath of the Elbe 2002 floods. An official of Saxony's Environment Ministry remarked for instance that no Saxonian politician at the local or state level could afford to water down the regulations to safeguard the population in the aftermath of the 2002 Elbe when the process of determining USGs was initiated in Saxony (SMUL 2008, interview).

Public flood managers involved in land-use regulation had another reason to choose clearly and consistently delineated HQ100 USGs. Such clear and consistent definitions of legal categories are an important prerequisite for being able to impose substantial restrictions on the development of these areas. Such restrictions – interfering with socio-economic processes and individual property rights – are subject to judicial review through Germany's public law court system. A water expert from NRW's Environment Agency remarks that:

> "USGs as formally-codified legal concepts need to be black and white. (...) In the interactions between legal staff [*Juristen*] and flood specialists [*Hochwasserexperten*] [within the public administration], the *Juristen* do not step back from such simplistic binary conceptualisations" (LANUV 2009, interview).

This black-and-white approach is problematic from the viewpoint of the water expert because of the uncertainty involved in calculating an inundation

area. As the same expert suggests in relation to defining inundation areas: 'for a HQ100, you can always add or subtract 10%' (ibid). HQ100 (being a long-established concept in water management and closely linked to safety levels provided by flood defences) offers a sufficiently clear technical and legal basis for tight restrictions that would also withstand judicial challenges (see note in 'detecting' section on '*allgemein anerkannte Regeln der Technik'*).

In contrast to the more restrictive and thus politically controversial legal category of 'inundation areas' the second spatial category of the HWSG, the 'flood-prone areas', remain unspecified in terms of boundaries and restrictions – thus enfolding limited regulatory effects (also see the next section on 'effecting'). According to the HWSG 'flood-prone areas' need to be mapped and appropriate precautionary measures are to be undertaken if flooding is expected to cause significant adverse effects on the well-being of the general public. This vague standard leaves Länder and local authorities with substantial latitude to decide whether or not to designate an area as 'flood-prone' and what (if any) measures they might pursue as a result of that designation. Regulations at the Länder level are similarly unspecific. For instance NRW's Water Act proposes that the responsible water authority may undertake 'measures to prevent or reduce adverse consequences to the public good' (LWG §114a). In Sachsen-Anhalt the Water Act requires water authorities to make a note of the flood risk when permitting developments and land use in such areas (WG LSA §98a) while Saxony has (as noted earlier) yet to transpose the concept into legislation. One reason for the planners' hesitation to regulate 'flood-prone areas', as the discussion in effecting (i.e. implementing the Länder obligation to map and regulate such areas) will show in greater detail, is that it carries legal risks for the regulators, as infringements of property rights in protected areas behind dykes and are likely to be challenged in court.

Part of this section's discussion echoes aspects found for 'detecting'. In Germany's land-use domain the concept of risk plays an important role in

defining the (relatively narrow) boundaries of the 'regulatory state' across Germany. Regulatory activity is focused around the HQ100 zone for which concrete, nationally consistent and restrictive regulations exist. The restrictions imposed on these areas have also been contested by interest groups, but key restrictions have remained in the HWSG – reflecting the political momentum for tighter regulations in the aftermath of the 2002 Elbe floods. Areas beyond the USGs did not attract much political attention. This is mostly because regulations of flood-prone areas are very generic and vague.

Moreover the regulated USG normally ends where flood defences begin (if appropriately designed defences exist). This suggests that regulation is only needed in areas not protected by the flood defences – highlighting the faith in technical control and underpinning the safety promises in Germany's flood regime noted in Chapter 5. The discussion in 'directing' also highlights the importance of courts and judicial review within the land-use domain. Actors in Germany's land-use domain are also aware of the need to justify restrictions on land use in the context of judicial reviews underlining the important role for public law courts (*Verwaltungsgerichte*) in Germany's regulatory state.

### 6.2.3 Effecting: Enforcing restrictions on land use

In general effecting in the land-use regulation domain is about shaping the behaviour of individuals and their aspirations to use land at risk from flooding for economic purposes and individual welfare. The effecting discussion is, however, mostly concerned with the enforcement practices within the planning domain – in particular at the local planning level. In Germany's land-use domain the post-2002 revisions of regulations – in particular the HWSG and subsequent adjustments of Länder legislation – resulted in a bifurcated pattern of enforcement and human behaviour modification. In 'inundation areas' rule enforcement is effective. In contrast land use in vaguely defined 'flood-prone areas' is subject to vague regulation, and so shows few signs of modification.

This focus on the local authorities and their enforcement of rules has also been discussed in Germany in the aftermath of recent flood disasters, in particular the Elbe 2002 floods. Lessons learned reports, such as the one by the DKKV (2003), report a number of examples that demonstrate a lack of awareness of flood issues and the pursuit of other objectives in urban planning prior to the 2002 floods. For instance Dresden's local councillor responsible for urban planning had been in negotiations with developers before August 2002 to declare a *Baugebiet* (area dedicated to development) on one of the historical, drained Elbe creeks: a high-risk area that was unsurprisingly completely inundated during the 2002 floods (ibid:43). Echoing this a local planner from Saxony suggests that:

> "in the old *Bauleitplanung* [local planning] from the 1990s, there is little about flood management. It was just not that important before 2002" (Planning Authority Dresden 2009, interview).

A Landes level planner from NRW points to the dynamics of the 'escalator effect':

> "There were indeed *Bauleitpläne* [local plans] that were happily planning for construction on floodplains. They just assumed that once these areas have been developed, we'd just build some new defences" (MWME 2009, interview).

This neglect of flood management in local planning contrasts with the potentially positive contribution more restrictive local planning practices could make to flood management. Through their *Bauleitpläne* and *Baugenehmigungen* local planners have a 'comprehensive toolkit to ensure effective flood management' (ELLA 2006:64) at their hands.

With the overhaul of Federal and Länder level regulations in the aftermath of the Elbe 2002 floods the neglect of flood risk has become more difficult – albeit only in USGs. In fact while systematic data on the effectiveness of the regulations of 'inundation areas' and 'flood-prone areas' across Germany is(in contrast to England) not available, interview data combined with reviews on the Rhine Flood Action Plan implementation provide a strong indication of a two-tiered implementation pattern.

USGs and their tight regulation are widely seen as effective means to restrict development and safeguard water retention space between river channels and defence line. As one regional spatial planner explains:

> "the only thing that we can actually imagine and see in practice are ports and shipyards. The catalogue [of conditions] is very restrictive and rules out any *Bauleitpläne* in USGs" (Regional Water Authority Düsseldorf 2009, interview).

This is also confirmed by evaluations of the implementation of the Rhine Flood Action Plan, including measures of land-use regulation, flood defences and flood warnings. As the ICPR notes in its progress report from 2005:

> "within non-protected areas, the [Action Plan] target for the reduction of damage potential [from 10% until 2005, 25% by 2020] is being achieved through keeping space undeveloped, improved defences, and improved information of the population. The reduction within these areas stood on average at 20-30% [by 2005]" (ICPR 2005:6).

On the other hand (in contrast to the effective regulation within USGs) the aforementioned ICPR report suggests that efforts to reduce damage potential in areas behind the defences were much less effective:

> "There was a limited reduction of damage potential behind flood defences. The target of 10% by 2005 will only have been accomplished because planning and flood awareness measures have been combined with flood management measures to reduce the probability of flood events [such as improved water retention and defences]" (ICPR 2005:6).

Mirroring this a Landes planner from NRW admits that:

> "this residual risk, of extreme events and dyke failure, we have been displaying in our regional plans. We ask subordinate authorities to take flooding into account in these areas but I have to admit that it is not very effective" (MWME 2009, interview).

Previous planning practices that failed to take into account flood risk can be associated with the pursuit of alternative spatial planning objectives – in particular economic development – in addition to the lack of risk

awareness in the absence of adequate risk assessments and regulation. The conflict between economic interests (and interest groups) and safety concerns is mitigated through the particular organisation of responsibilities in Germany. While the local planners directly face economic interests their ability to accommodate these interests through favourable planning decisions is restricted, thanks to the tightened regulations on Länder level and through the HWSG. A local planner of Dresden remarks:

> "as local planners, we are really cornered. The investors at some point ask us 'where if at all can we build?'. So there are often tensions... which we cannot resolve because of the regulations" (Local Planner Dresden 2009, interview).

Discretion for local planning decisions is also narrowed by state-level and regional regulations and plans. A Landes planner points to a 'hierarchical chain of plans [through] which we control the lower planning levels' (MWME 2009, interview). The producers of these plans at 'higher' (most importantly regional) planning levels are not directly exposed to such pressures to permit development. A regional planner in Düsseldorf notes:

> "In terms of economic interests, we don't really see or hear about them. We are mainly dealing with the local governments. They may report to us that the investor s X and Y may have approached them. And it is ultimately the local government that has to respond to the investor. Does the local government want to change its plans to accommodate the investor? The local government then passes on the request to us and we check: USGs yes or no? And that's it for us! For us, the issue of flooding and flood management is easy to handle" (Regional Planning Authority Düsseldorf 2009, interview).

In fact the regional planners point out that their distance to the local conflicts of interests and the subsequent ability to make legalistic decisions is welcomed by the local level:

> "Sometimes the local governments tell us that we don't want this either but it would help our negotiations at the local level if the regional government had ruled out a proposal" (ibid).

The local level therefore not only perceives the restrictions on their planning discretion as a problem but also as a means to deal with pressures by the local business community.

Moreover regional and local planners also strongly rely on the inputs and approvals from regional and local water authorities. In controversial development decisions the ultimate decision as to whether a development proposal is situated within the boundaries of the USGs or acceptable in spite of being situated within it is taken by the water authorities. From a regional planners' perspective:

> "Well, we would get the [more controversial] proposals at some point, and we would tell the local government that we cannot make a decision but that we need an expert assessment. And the local planners in turn would ask at the local environment authorities. I am happy as soon as I see that the calculations show it is flood-free but I would probably ask the experts for flooding in our house" (ibid).

Given this central role of the specialist administration in planning decisions it becomes understandable why flood managers are attentive to the judicial review and thus ensure the procedural suitability of their assessments and operations.

Beyond the USGs restrictions on development are limited. As noted the legal concept of flood-prone areas is vague and underdeveloped, and consequently so are the regulations associated with them. A local planner from Dresden notes, in explaining the delay in Saxony's legislating and implementing of the legal category of 'flood-prone areas':

> "so while we make progress on understanding flooding, we have to make sure that this progress is somehow reflected in administrative planning practice. (...) If I withdraw a right [to develop] from someone, it becomes an *enteignungsgleicher Eingriff* (intervention similar to expropriation). I deprive the citizen of value – I mean he could build on the property or sell it. That is not easy to deal with legally" (Local Planner Dresden 2009, interview).

The problem with 'flood-prone areas' is that they are not only legally vaguely defined but that their definition refers to areas behind defences, i.e. protected areas. Depriving citizens of certain property rights when their or other citizens' safety is not substantially threatened (due to the protection through flood defences) may be interpreted by the courts as a disproportionate intervention into individual property rights. These rights are constitutionally protected (Article 14, paragraph 1). Any infringement of these rights needs to be justified as serving the public good (*Wohl der Allgemeinheit*) and requires laws that describe the type and degree of compensation to be paid to the addressee of the intervention (Article 14, paragraph 3). With compensation payments looming the local planner from Dresden remarks that there have been 'too few court decisions' (Local Planner Dresden 2009, interview) across Germany to allow predictions about how courts will evaluate restrictions on development within these areas. This uncertainty suggests a reason for the absence of 'flood-prone areas' in Saxony's Water Act.

An interesting two-tiered pattern therefore also emerges for effecting in Germany's land-use domain, mirroring the findings on the patterns of regulation for the function of 'directing'. Within the narrow confines of the 'inundation areas' the restrictive regulation is effectively enforced – largely unaffected by local conflicts of interests as a result of the limited discretion of local planners where planning issues concern areas at flood risk (planning hierarchy; strong role of water authorities in planning for areas at flood risk). Outside these confines there are few rules to be enforced, and attempts to impose restrictions on the use of land carry the risk of being judicially reviewed.

The implications of these patterns for the arguments about risk-based 'better regulation' will be discussed more extensively after the following discussion of England's case. What is notable however, is that Germany's land-use domain – with its binary regulations and enforcement practices –

bears little resemblance with the more flexible, variable risk-based land-use regulation expected from a 'better regulation' perspective.

### 6.3 EXAMINING RISK IN ENGLAND'S LAND-USE REGULATION

England's general planning regime was established through the Town and Country Planning Act (TCPA) from 1947, which aimed at controlling urbanisation of the countryside (Rydin 2003). The TCPA charges local planning authorities with two main functions: first to produce local development plans and frameworks[61] and, second, to grant licences to applicants seeking permission for developments not ordinarily permitted under the TCPA. Planning decisions about this second development control function are to be made in light of the development policy framework set out in local plans, wider regional spatial strategies[62] prepared by regional planning bodies and national policy guidance issued by the central government department DCLG (and its predecessors).

Early national planning policy guidance in the form of circulars (e.g. Circular 31/47 from 1947) advised local planners to liaise with drainage authorities to avoid any adverse impacts of developments on drainage/flood management facilities and functions. In the early 1990s following the increasing criticisms of the traditional defence-drainage approach (Scrase and Sheate 20005) land-use managers emphasised flood risk as a material consideration for planning through a new circular, Nr 30/92 from 1992. The 1992 circular was followed by a rapid expansion in national planning policies and guidance in the aftermath of the 1998 and 2000 floods and in the wider context of New Labour's programme of planning policy reform (Clifford 2008). These new national planning policies – principally Planning Policy Guidance note 25 on Flooding (PPG25) introduced in 2001 and its successor the Planning Policy Statement from 2007 – contain the regulatory

[61] With the Planning and Compulsory Purchase Act from 2004, a transition from local development plans to local development frameworks was initiated.

[62] As in the case of local development plans, structure plans by regional planners were replaced by regional Spatial Strategies (RSS) that were introduced in 2004. Local plans have to be in 'general conformity' with RSS.

core of the current planning domain within England's flood regime that shapes individual planning decisions and development plans at the local level, and will be discussed in the following sections. In contrast to Germany specialist regulations in the water and flood management legislation primarily concern the relations between the Environment Agency and planners. For instance the Environment Agency serves as consultee to the local planners for flood-related development issues and is obliged to report to DEFRA (Outcome Measure 8) on how many planning decisions are taken by local planners against the Environment Agency's objections.

### 6.3.1 Detecting: Flood mapping and enforcement monitoring

The discussion of England's detecting centres around the increasingly systematic and consistent production of flood maps that cover a much larger area with their flood zoning than Germany's legally required flood mapping while ignoring the effects of flood defences. However a second type of information has been collected since 1999, namely systematic information on the implementation of national policies through local planners. Such systematic monitoring of the performance of land-use regulation is not in place in Germany.

Early systematic attempts to map flood hazards in England were initiated under the Water Act from 1973. Under Section 24(5) this Act obliged the ten regional water authorities of the time to produce extensive surveys of areas with flood and drainage problems. However these maps had a limited impact on the planning system. Penning-Rowsell and colleagues (1986) argue that the surveys were riddled with inconsistencies in terms of methods, scope and quality and could therefore not be instrumental as a basis for systematic land-use planning and flood defence decisions. Moreover Bowers (1983) interprets the surveying of that time as a means to justify further drainage for agricultural production rather than as a decision aid to enable planners to identify (and thereby control) developments potentially at risk from flooding.

The ‘surveying’ was put more explicitly into a planning context in the early 1990s. Circular 30/92 refers to the so-called Section 105 surveys that should be taken into account in the planners’ structure and local plans. Under Section 105 the Water Resources Act from 1991 placed a duty on the Environment Agency (EA) and its predecessor (the National Rivers Agency (NRA)) to undertake surveys in order to define floodplains defined as HQ100 areas.

However the progress in mapping was deemed insufficient in the aftermath of the Easter 1998 floods. Many areas that were previously thought to be at low risk were inundated. Peter Bye and Michael Horner note in their influential ‘Lessons learned’ report that the mapping process was:

> “far from complete nationally [and that] the defined extents [of floodplains] [were] often no more than crude estimates” (1998:41).

Thus immediately after the Easter 1998 the EA sought to produce a nation-wide map, the Indicative Flood Map (IFM). The IFM was a first attempt, consisting of a patchwork of the best available (mostly locally generated) flood maps, and became available in 2001. In 2004 the EA replaced the IFM with a new nation-wide Extreme Flood Outline (EFO) Map that serves as the basis for land-use decision-making. In contrast to the IFM and the earlier mapping the new EFO map relied on applying a consistent modelling, data and analytical framework[63] (Porter 2010). The EFO Map – reflecting the particular requirements of planning policies under PPG25 – introduces three main flood zones, namely a low probability (Zone 1, <HQ1,000), a moderate probability (Zone 2, HQ100 to HQ1,000) and a high probability zone (Zone 3a+b[64] with >HQ100).In contrast to Germany’s maps the definition of these flood zones in the EA’s EFO map does not take

[63] More precisely, the consultants tasked by the EA to produce the map made use of the same hydraulic model (J-Flow), digital terrain model (IF-SAR, interferometric synthetic aperture radar) and probability model (FEH, Flood Estimation Handbook).

[64] The ‘high probability’ zone 3 (>1-in-100 years frequency) is differentiated into ‘a’ and ‘b’. The zone 3‘b’ denotes the functional floodplain, defined qualitatively as those areas used for water storage and flow in the event of a flood but for whose identification a probability of HQ20 or greater is to be used as a quantitative reference point.

into account the protective effects of existing flood defences in tracing its flood zones – though it does show which areas benefit from flood defences.

In addition to providing the IFM and then the EFO Map the EA also advises local planners on development control and on their decisions on individual applications from prospective developers for development projects. In fact the Environment Agency has, under the Town and Country Planning General Development Procedure Order No 2375 from 2006, been made a *statutory* consultee on development plans and planning applications within flood risk areas.[65] This EA advice to planners carries even more weight since the Flooding Direction from 2006 also compels local planners to notify the regional Government Offices of any planning decisions concerning so-called 'major'[66] development proposals taken against the advice of the Environment Agency.

Finally in addition to central government maps and advice local planners are also required by PPS25 to commission their own risk assessments, SFRAs, which should follow nationally consistent modelling guidelines set out by the EA. SFRAs take as a starting point the EFO Map and its different flood zones, but go beyond it in their spatial resolution and more detailed consideration of issues not considered in the EFO Map, such as different sources of flooding; the velocity and depth of flood waters; the potential effects of climate change on flooding; and only where the so-called Sequential Test is not sufficient to allocate planning permissions[67] the location, conditions and effects of flood defences.

A number of interesting changes to England's risk assessments in the aftermath of the 1998 and 2000 floods can therefore be observed. Risk assessments are increasingly consistent. The EA acts as the central risk

[65] This means for all development proposals for zones 2 and 3, as well as those to be located in an area of zone 1 where a critical drainage problem exists. Beyond these probabilistically-defined responsibilities the EA also is to be consulted if the development is larger than one hectare.

[66] Major means ≥10 dwellings or 0.5 hectare for residential developments.

[67] This is only applicable to highly vulnerable developments in zone 2, medium vulnerability buildings in zone 3a and essential infrastructure buildings in zone 3a+b. In these instances the Exception Test is to be applied. For further details, see table 6.1.

information provider; this includes producing guidance on how other actors are to undertake risk assessments. Moreover the EA (in its IFM and EFO maps) chooses to disregard the effects of its flood defences when delineating areas at risk of flooding. These shifts can best be understood by considering the particular challenges faced by the involved actors in the English land-use regulation domain.

As in Germany flood maps delineating areas at risk are contested because they imply restrictions on alternative uses (mostly the economic exploitation) of land. One example of this contestation is the response to the IFM. This patchwork map was replaced within a few years of being introduced with great fanfare by the Agency, partly because its variable quality and inconsistencies were criticised by local planners (Porter 2010). Variability and inconsistencies were perceived as problematic because they opened planning decisions to challenges from developers that questioned the accuracy of the level of flood risk found in the map for certain areas of interest for development. A local planner of South Holland Council notes:

> for rejecting a development proposal, we have to be confident in the data we use. The IFM still raised a large number of questions" (Local Planner South Holland 2009, interview).

Confidence in the data also matters to the Environment Agency itself. In an internal report (EA 2004a) on flood mapping the EA stresses the importance of consistency in the detecting function. For its flood maps the EA ruled out the use of historic data 'where we cannot be confident that the outline had been recorded accurately', or 'flood outlines that are not supported by numerical analysis or historic evidence'. Such locally derived information is 'not appropriate' because data have to be 'defensible and auditable' and issues such as 'our reputation, political issues, litigation etc.' need to be considered. Both EA and local planners are therefore concerned about challenges to the informational foundations of land-use regulations and emphasise consistent, formalised risk assessments as the basis for their regulatory interventions. This emphasis echoes Ted Porter's arguments

about the perceived 'objectivity' of formalised, numerical evidence considered expedient for justifying bureaucratic interventions (Porter 1995).

While local planners perceive a need for defensible development decisions they have also been found to disregard the objections of the Environment Agency concerning planning proposals for areas at flood risk (see sections on 'directing' and 'effecting'). For the EA the planners' disregard of flood management considerations is problematic because it results in developments that increase the damage potential from flooding. This not only undermines the objectives of flood management but also entails institutional risks to the EA. The EA is likely to attract some of the blame after a flood because of its role as the key central government body for flood management. A local planner for instance observes that:

> "the Environment Agency is becoming more concerned [about development and flooding]... and there is an element of blame there... and to be fair, they are the ones of the frontline so if flooding occurs, they are the ones the people turn to" (Local Planner South Holland 2009, interview).

Strengthening the role of the Environment Agency's risk advice therefore serves as a means to improve control over local planners. In the words of an EA official:

> "if the Agency wants to have an influential role in land use planning debate, it needs to give its information to planners" (Environment Agency 2008b, interview).

The proliferation of risk assessments has indeed changed the terms of debate between local planners and the EA. A local planner remarks:

> "Now we local planners are in a much better position to talk to the EA. They say what they think, we say what we think is right. (...) It used to be a battle between us and them. They told us what to do, that we had been naughty and what was good for us. (...) But it is now a scientific debate, not one about we are right, and you are wrong" (Local Planner South Holland 2009, interview).

While this suggests a perceived empowerment of the local planning authority scientific expert knowledge on flood risk is really concentrated in the EA. This expert knowledge can in turn be argued to confer, following Foucauldian arguments made by Rose and Miller (1990), a 'social authority' to the EA that can be used to align interests between autonomous actors. The discussion in the following sections on 'directing' casts further doubt on the empowerment of local actors through centrally-generated and shaped knowledge.

While it may not be empowering the 'indirect' control through risk assessment and expertise is not without challenges. One example that illustrates the limits of indirect control is the continued disagreement with EA's advice (see figure 6.4 in 'effecting'). Another example of 'resistance' against the centralisation of risk assessments is found in the successful lobbying against undertaking regional risk assessments as a basis for Regional Spatial Strategies (RSS) as introduced under PPS 11. Rather than risk *assessments*, RSS are based on Regional Risk *Appraisals*.

> "We were worried about the regional flood risk assessment. (...) An appraisal is a broader view of what's happening across the region. The fear that I and other planning officers have is that if you [based on the more precise risk assessment] start to apply the sequential approach at a regional level, then you'd say South Holland and Boston are the highest risk areas so we should not develop there at all... Lincoln and other areas are on higher ground. We will build there instead" (Local Planner South Holland 2009, interview).

The EA therefore uses risk information to reduce the number of planning decisions that potentially increase the damage potential – thereby limiting the institutional risks associated with the failure to prevent damage from flooding. The latter concern of EA can also be argued as being reflected in the treatment of flood defences on the EA's Flood Map. Drawing a line between regulated 'dangerous' areas and unregulated 'safe' areas – as seen in Germany with its HQ100 standards and acknowledgement of the effects of flood defences – reinforces public expectations of state-

provided safety. The EA's flood maps (publicly available on the EA website) however, ignore the effects of flood defences when determining the flood zones. As an EA expert involved in preparing land-use regulations notes:

> "we try to emphasise that risk is a continuum, and that there is no such thing as a safe place" (Environment Agency 2008c, interview).

This emphasis on the absence of safety underlines the message that the public should not expect to be fully protected through government interventions.

This management of public expectation has become increasingly important for actors within the land-use domain as devastating floods have increased public and political interest in flood management decisions resulting in post-disaster inquiries (e.g. Bye and Horner 1998; Pitt 2008) and Parliamentary processes (e.g. SCA 1998; EFRA 2008)). These concerns about Parliamentary and public scrutiny of planning and flood management decisions are further reinforced by the Parliamentary monitoring of flood-related decisions in the form of High-Level Target 5 and Outcome Measure 8. --These monitoring tools oblige the EA to gather information on development control and flood risk – including information on planning applications for flood risk areas, compliance with EA advice on planning decisions, and the reasons for local disregard of EA advice – and to report on these issues annually to DEFRA and the Parliament (MAFF 1999). This information-gathering is an outcome of the Parliamentary debate after the Easter 1998 floods in which the SCA (1998) noted that the Parliament and central government departments have a very limited knowledge about the degree to which national policies were implemented at the local level. The data on non-compliance with EA advice increases pressure on local planners to take such advice into account. As a local planner notes:

> "the Agency reports on how local planners take into consideration the Agency's advice. We got caught one year. Well not 'caught' but we were on the top of the list for acting contrary to Agency advice. (...) It turned

> out that most of [the cases] were rather trivial. Like house extensions for which somebody failed to produce a flood risk assessment. But we stopped it anyway afterwards – and I think last year, we haven't had any against the Agency advice" (Local Planner South Holland 2009, interview).

At the same time the EA also reports on the reasons why local planners disregard EA advice (for example scrutinising its own supply of timely and suitable advice).

The discussion of detecting in England's land-use domain provides important insights into the form that England's regulatory state in flood management has assumed. The boundaries of this state are more extensive than those of the German state, covering an area that is defined in risk terms as HQ1000. Several probabilistically-defined flood zones are identified as required by the PPG and PPS25 – the main regulatory instruments of the land-use domain. Finally by ignoring the effects of flood defences the EA's Flood Map contributes to addressing the problems of poor flood awareness (by communicating the uncertainty of physical protection) and asset accumulation in defended areas (by paving the way for regulating land-use even behind defences).

### 6.3.2 Directing: Defining restrictions on land use

England's directing changed significantly in the aftermath of the Easter 1998 and autumn 2000 floods. Most notably central government guidance to local planners has become much more detailed and is systematically based on several risk and vulnerability categories. This is largely a response to the perception by the central government that local planning decisions prior to the floods failed to take into sufficient account of flooding, and that risk-based regulatory instruments offer suitable tools to ensure that local planning decisions are aligned with the government's wider policy strategy on flood risk and with the interest of the EA (as its delivery agent) in reducing damage from flooding.

Prior to the Easter floods there was little regulation forcing planners to consider flooding as a material consideration in their decision-making. In 1992 planning Circular 30 introduced the general idea that flood risk should be taken into account when generating local development plans and deciding on particular planning proposals. However there was little guidance as to what exactly it meant to take flooding into account. Discretion reigned. The 1998 Easter and even more so the autumn 2000 floods however, catapulted the issue of development control and flooding to the forefront of the flood management debate. More specifically it was found by the EA that:

> 'in the Easter event we have numerous examples of developments, whether structured buildings or caravan parks, which were allowed against the advice of the Agency and its predecessors'(SCA 1998b, Question 5).

Bye and Horner's futile search for more recent evidence of this disregard of EA advice casts some doubt on this assertion, even though the authors found indications of failures of development control for the 1980s (Bye and Horner 1998).

Those doubts notwithstanding, the public discussion resulted in a call for stronger guidance from the EA to direct the decision-making of local planners along with calls for tighter monitoring of the implementation of national policies by local planners under HLT5 (SCA 1998). As a consequence a review of the Circular 30/1992 was instigated, resulting in Planning Policy Guidance note number 25 (PPG25). The EA hoped that by replacing a circular with a planning policy guidance[68] note, flooding would be taken more seriously in local planning decisions (DETR/DCLG 2009, interview). It is, however, important to note that both types of national

[68] The differences between Circulars and Planning Policy Guidance are not in their substance but in their perception by the actors involved. According to one of PPG25's authors (DETR/DCLG 2009, interview), the EA insisted on using a PPG because they perceived it as a more effective means to raise the profile of flood risk among planners than Circulars. Formally both types of documents are used to explain statutory provisions and guide local planning.

policies can only contain non-binding guidance and recommendations to local planners rather than assuming a compulsory character.

While a draft version of PPG25 was available as early as spring 2000, PPG25 was quickly revisited after the autumn 2000 floods so that when PPG25 was eventually published in 2001 the guidance was much stronger. The final PPG25 converted the idea of Circular 30/92 to take flooding into account into a systematic, risk-based regulatory core in 2001's PPG25. PPG 25's regulatory core consists mostly of the Sequential Test.[69] This Test advises local planners how to, when allocating sites in development plans and deciding on individual proposals, give priority in descending order to flood zones as laid out in PPG25 (and identified on the EA's Flood Map) – namely from low risk (zone 1) to moderate (zone 2) to high risk (zone 3). Given the 'steering away' from high-risk areas and the disregard of the effects of flood defences, this risk-based regulatory core points to a precautionary stance towards development in areas at flood risk. Indeed in something of a departure from the UK's usual stance (O'Riordan and Cameron 1994), PPG25 explicitly invoked the precautionary principle to justify its approach to regulating development at risk of flooding (see Foreword of PPG25).

The shift towards a more precautionary stance was not only disaster-driven but also resulted from the interventions of different interest groups. Given the potential benefits of the economic development of flood risk areas one set of actors opposed to a tightening of land-use regulation were developers. Unsurprisingly developers as represented by the House Builders Federation (HBF) criticised the shift towards a more precautionary approach to developing on flood plains. The HBF argued in their contribution to the consultation for the post-1998 report of the Select Committee of Agriculture (SCA 1998) that the principle of 'safe development' (i.e. development is

[69] The Sequential Approach, i.e. the planning principle that identifies, allocates and develops certain types or locations of land before others is a common tool within England's planning regime, for instance, also being used in other PPGs (e.g. PPG 3 on Housing).

permitted in flood risk areas if it takes place behind flood defences) should be maintained and that the implicit 'presumption against development in floodplains' as a result of the precautionary stance is a 'very negative approach' (HBF 1998:2). However the developers' opposition to the introduction of a more precautionary stance in development control stood against strong support for such a shift by a wide range of other organisations – ranging from environmental groups to the insurance industry (Johnson et al. 2003). One of the authors of PPG25 remarked that:

> "the responses [to the consultation] were that the developers said that this is too 'green', the 'greens' said it gives far too much latitude to the developers. Which wasn't surprising. And as both sides were not quite satisfied, we felt we got it about right" (DCLG/DETR 2008, interview).

PPG25 also introduced the idea of taking into consideration the vulnerability to flooding of different land uses when deciding whether to permit their location in a particular flood zone. The PPS25 from 2007 elaborates on the notion of vulnerability through a five-category vulnerability classification from essential infrastructure (such as utilities) to water-compatible infrastructure (such as flood control infrastructure). Moreover PPS25 also introduced the Exception Test. Based on this test planners can consider allowing development in higher probability zones involving relatively more vulnerable assets under certain circumstances. Exceptions can be made where a development provides wider sustainability benefits that outweigh flood risk, is safe and does not increase flood risk elsewhere while being situated on previously developed land. The Exception Test therefore allows for greater flexibility in planning decisions. The following table 10 provides an overview over the risk-based factors to be taken into account when regulating land use.

| | | Essential infra-structure | Highly vulnerable | More vulnerable | Less vulnerable | Water compatible |
|---|---|---|---|---|---|---|
| **Flood zones** | Zone 1 (>HQ1,000) | Yes | Yes | Yes | Yes | Yes |
| | Zone 2 (HQ100-HQ1,000) | Yes | Exception test | Yes | Yes | Yes |
| | Zone 3a (<HQ100) | Exception test | No | Exception test | Yes | Yes |
| | Zone 3b (<HQ20) | Exception test | No | No | No | Yes |

**Table 10: Flood risk zones and vulnerability classifications, PPS25**

The Sequential Test along with guidance for risk assessments and other tools such as the Exception Test was further elaborated under PPS25, especially through its Practice Guide (DCLG 2007d; DCLG 2007c). The Practice Guide is a step-by-step guide with best practice examples from the different types of risk assessments underlying planning practice (e.g. the Flood Map and the SFRA) giving the application of sequential and exception tests to various risk management options (e.g. making developments in higher risk zones more resilient).

To summarise, national planning policies underwent a step-change towards a more precautionary approach to planning in flood risk areas in recent years – driven by the political and public discussion in the aftermath of the 1998 and 2000 floods and supported by a wide range of interest groups. This greater emphasis on precaution is reflected in the systematic identification of areas at flood risk and guidance to local planners to steer away development from the relatively higher risk areas. At the same time the guidance promotes a particular flexible, risk-based treatment of proposals through the planning authorities. This implies risk-based targeting of

regulations and seems to fit with ideas of 'better regulation' (even though it also implies 'more regulation').

To understand the introduction of this sort of risk-based guidance and tools such as the Sequential Test, it is important to take a closer look at the internal dynamics within the planning system. As the discussion of detecting highlighted, risk instruments can also be interpreted as means to ensure that local planners take planning decisions in line with the EA's advice. This particular function of risk instruments is acknowledged by the involved actors. One of DCLG's authors of PPS25 for instance points to the benefits of the new guidance in shaping local decision-making. He notes that:

> "what the Sequential Test does is to offer a way of structuring the thinking of local planners" (DCLG/DETR 2009a, interview).

Moreover, the same official notes:

> "there was a need to formalise the approach. You have to understand that local authorities like tools! Give them a tool and they use it. And there are loads of tools in PPS 25: There is the Flood Map and the Flood Risk Assessment which is the assessment tool, then there is the Sequential Test and Exception Test" (ibid).

This subtle directing of local planning is partly welcomed, and partly viewed critically by the local planners. Thus local planners find:

> 'the Sequential Test [...] quite useful. We have these risk zones on our maps and can apply them' (Local Planner South Holland 2009, interview).

At the same time the instrumentalisation of these tools to exercise influence is recognised by local planners as the following comment concerning the PPS25's practice guide for risk-based decision-making in land use shows:

> "The PPS Practice Guide is a bit of a double-edged sword (...) because it is also being used by the EA. In some ways, the EA staff is more familiar with the guide than local planning officers. They tend to quote paragraphs to tell you: You can't do that. So the guide is helpful but also irritating" (Local Planner South Holland 2009, interview).

These indirect mechanisms of control are complemented by further indirect mechanisms such as the publication of HLT5 monitoring results as well as direct mechanisms, such as the increased weight of the Secretary of State in reviewing and if necessary overturning local planning decisions (through the Flooding Direction).

The discussion of 'directing' in England's land-use domain reveals important characteristics of England's regulatory state. In addition to their extensive territorial coverage (HQ1,000) regulations vary in accordance to different risk levels. For instance particularly vulnerable uses of land (such as caravan sites) are not permitted within certain high-risk flood zones. At the same time essential infrastructure and moderately vulnerable (after passing the Exception Test) as well as less vulnerable land uses are permissible even in high-risk flood zone 3. This illustrates the flexibility and fine differentiation in England's approach to land-use regulation. From a regulatory state perspective this may be interpreted as providing means to move away from simple binary differentiations (of safe/unsafe and tight restrictions/unregulated) to a wider, more variable web of regulations that allows targeted interventions for the pursuit of both goals of precaution and utility maximisation in flood risk areas.

### 6.3.3 Effecting: Enforcing restrictions on land use

Even though a planning regime had been in place since 1947 and an increasing concern about development in flood risk areas has been expressed in policy guidance since the early 1990s, this has not prevented the encroachment of areas at risk from flooding. On the contrary more than five million homes are still at risk from flooding (EA 2009), and a recent green paper on 'Housing' (DCLG 2007a) set the target of an additional 2.5 million houses by 2016. Reflecting on even more ambitious housing targets set earlier the National Audit Office (NAO) notes in its 2001 report on flood defences that:

> "the nature of this country's geography and its housing needs are such that there is significant pressure to build in 'flood plains' which by their nature are more prone to flooding than other areas" (NAO 2001:15).

With the introduction of the Flood Map, Sequential Test and other risk instruments the EA tried to ensure that the planning system takes flooding more seriously. Figures collected under HLT5 (EA 2004b; 2006; 2008) indeed show positive effects. One indicator of how the planning system has become more responsive to concerns about flooding is the declining number of planning proposals in flood risk areas. Figure 6 shows that the number of those proposals submitted to the Agency that required detailed consideration of flood risk has been declining since the introduction of PPG25. In view of the rising profile of the Agency as a consultee this suggests that developers and LPAs are showing greater awareness and consideration of flood risk as better risk information has become available.

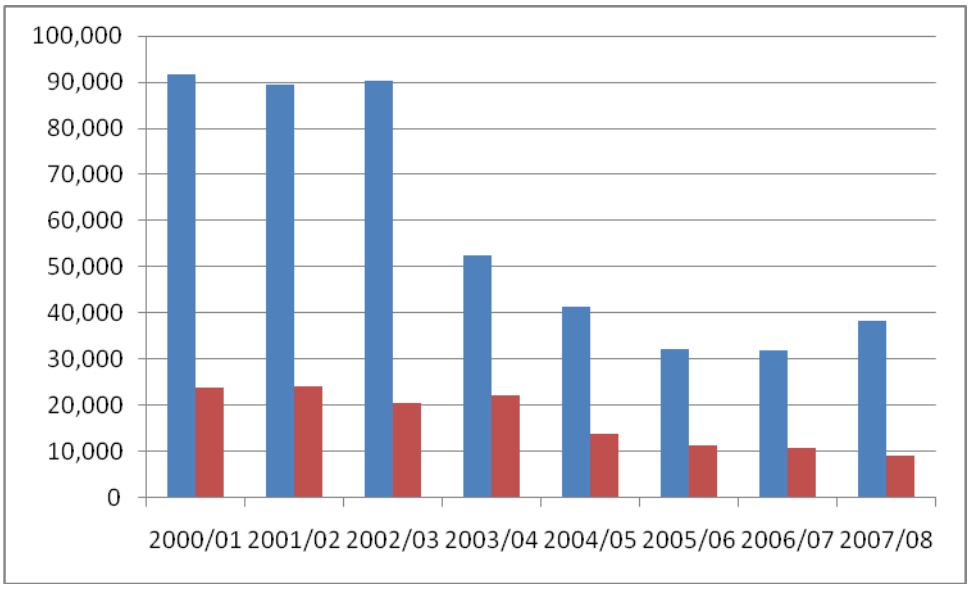


**Figure 6: Planning applications, flood risk and responses by the Environment Agency**

Note: Number of planning consultations on which the EA responded on all issues (blue) and number of EA consultations which required detailed considerations on flood risk grounds (red)

Source: EA 2004, 2006, 2008

The increased consideration of flood issues by local planners is not only reflected in individual planning decisions but also in their forward planning in the form of local development plans. For instance all newly devised local development plans from the local planning authorities contained explicit flood risk policies since 2004/2005.

While this evolution appears to indicate that flooding is being taken seriously at the planning stage by planners, recent reports by the Agency (EA 2008) note the 'disappointing' incorporation of some of the *risk-based* elements of national policy guidance into local planning documents. For instance in 2006/2007 (five years after PPG25 took effect) only five (8%) out of 62 local development plans in that year make an explicit reference to the sequential test. The following year the share rose slightly to 14 (18%) out of 77 plans.

Even more importantly further data on individual planning decisions, i.e. the concrete implementation of planning policies, illustrates the extent to which considerations of flood risk are being taken into account by local planners. The following figure 8 shows the share of planning applications for flood risk areas which were approved by local planners *against* Environment Agency objections.

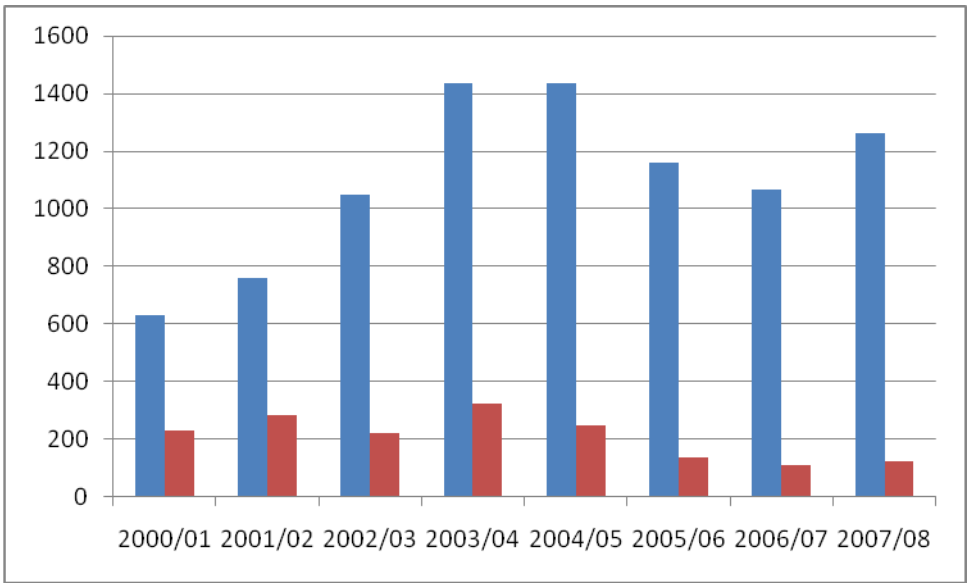


**Figure 7: Local planning approval against recommendation by the Environment Agency**

Development proposals where EA objections were made and sustained on flood risk grounds (**blue**) and proposals approved by LPAs contrary to EA advice (**red**)

Source: EA 2004, 2006, 2008

Like the previous graph Figure 7 shows that the LPAs' considerations of flood issues (as conveyed through the acceptance of EA's advice on planning proposals) has improved substantially since 2000/2001. In the first two years of HLT reporting local planners approved almost every four out of 10 planning applications *against* EA advice. After 2002/2003 approvals against EA advice declined substantially – even though they never disappeared completely and remained at 10% of proposals that were objected to.

One of the reasons why approvals in the early years of monitoring were sustained in spite of EA objections was institutional frictions between the Agency and local planners. As one local planner points out:

> "it was more about the fact that it was a new policy and the conflict between the Agency and the local authorities. It was perceived as a fight between us and them. (...) The Agency thought they were the only ones that knew what flood risk meant. And that therefore, they should decide how to deal with it – and the authorities should follow whatever they

> suggest. However, this is not a way of dealing with local authorities" (Local Planner South Holland 2009, interview).

However the decline in the share of approvals against objections is being explained by a mutual learning process and improved relations between the two sides:

> "On the one side, you had the Agency that acknowledged that there are other people that have something to say on flooding and planning issues. On the other side, there are local authorities that learned that there is something [climate change] going on that we have to take into account" (ibid.)

Even though this quote implies that institutional frictions have declined other data collected suggests otherwise. For the year of 2007/2008 LPAs explain approval against advice in 15% of the cases with reference to 'doubts as to the veracity and reasonableness of the advice' (EA 2008). And indeed a local planner from a low-lying area remarks:

> "flood risk assessments de facto sterilise whole areas. The Environment Agency would probably be very happy if we just said: 'Oh, there is flood risk so we don't build anything here'. But we are not going to do this. We need a more realistic approach. Sometimes we think the Agency advice is just silly" (Local Planner South Holland 2009, interview).

While institutional frictions explain some of the continuing approvals against EA advice there are also more administrative factors – for example belated responses by the EA on planning proposals to local planners (EA 2008).

Conflicts between the central government's flood managers from the EA and the local planners reflect the stakes involved in land-use regulation. While local planning takes an interest in retaining control over planning processes – partly in order to be able to potentially benefit from local, economic development (but also to achieve housing targets set by the central government) – the EA shows particular sensitivity towards the institutional risks of inadequate planning and therefore seeks to increase central planning

control. In this conflict risk instruments have become a key instrument of the EA to improve control.

## 6.4 Revisiting arguments about risk-based 'better regulation' in the land-use domain

This chapter reviews the regime domain of land-use regulation in relation to arguments about the function of risk in regulatory states. Risk can serve as an instrument to sharpen and refine regulatory interventions into the use of land in a manner that reduces potential damage from flooding while also permitting the economic use of land at risk. In order to address problems associated with regulation in general (mostly overly precautious and legalistic regulation, as well as the costs of regulation) and land-use regulation in particular (asset accumulation in areas at flood risk in particular behind flood defences), advocates for better regulation would expect the concept and instruments of risk to be used in a specific manner. First, risk can be used to identify which areas are at a risk significant enough to make interventions necessary so that asset accumulation is subject to regulation and flood awareness is promoted in such areas. Second, the regulation would be variable – taking into account different levels of risk and vulnerability so that overly precautious regulation of potentially economically beneficial land use is avoided. This requires a risk-based regulation of land use that establishes and takes into account differences in risk and vulnerability as well as the uncertainty of safety in areas at flood risk.

Land-use regulation in Germany and England's flood regimes raises questions about whether the pursuit of 'better regulation' – and the particular use of the concept and instruments of risk to this end – is really driving the organisation and operation of this regime domain. In fact in neither case is the risk-based organisation of the regime domain shaped by a 'better regulation' agenda.

Taking a closer look at each of the two country's cases Germany offers a case study in how risk-based regulation does not necessarily imply a

better regulatory state. Germany's 'regulatory state' makes only limited use of the available multi-zone flood maps, concentrating mostly on identifying HQ100 'inundation areas'. Moreover the effects of flood defences are fully reflected in German mapping and land-use regulation. This implies that the problem of asset accumulation in areas behind flood defences is not addressed, as the promotion of flood awareness and the regulation of developments in these areas are limited. Rather than highlighting the uncertainty of safety, risk instruments, by identifying inundation areas and integrating the effects of flood defences into flood zoning, have been used to distinguish between safe and unsafe, protected and unprotected areas. Finally the regulatory state debate also assumes that an autonomous agency staffed with specialists in their regulatory domain become central actors within a policy domain. However key actors involved in Germany's regulatory state do not include a particular autonomous expert agency. Rather, in addition to legislators and the implementing authorities, public law courts matter as potential reviewers of state interventions.

England's 'regulatory state' in the land-use domain resembles much more closely the ideal of a state whose interventions are targeted and increasingly informed by the expert assessments of an autonomous state agency. The coverage of England's regulatory state is extensive in terms of areas subject to regulation – namely all those areas inundated by events as rare as once in a thousand years (HQ1,000). Within this extensive area regulation varies with risk level and vulnerability of the development allowing for a variable and targeted regulation of land use. Moreover the effects of flood defences are ignored when defining flood zones, communicating the uncertainty of the safety provision through flood defences and ensuring regulation of land use even behind defences. Finally the semi-autonomous EA has become increasingly important for regulating land use by providing expert risk assessments and advising local planners on individual planning decisions.

However the use of the concept and instruments of risk is not exclusively driven by the pursuit of 'better regulation' in England but also by concerns about control and institutional risk. The EA in particular mobilises risk assessment and management instruments to exercise better control over local planning decisions, making sure that they take into account the issue of flooding and thereby reducing the damage potential of future flood events. The use of risk instruments therefore limits the institutional risks associated with post-disaster public blame allocation to the EA, because the damage from flooding is lowered through flood-aware planning practices and the fact that the EA has procedures in place that inform local planners about flood risk. Moreover risk calculations are also welcomed by local planners as a means to 'rationalise' their interactions in particular with developers (justifying restrictions on developments and thus mitigating the institutional risk of challenges to their planning decisions).

'Better regulation' is not the main motivation behind adopting a risk-based land-use regulation. Rather actors at the central government level in both countries seek to improve control over decision-making by local actors in the regime domain to ensure that flood damage potential is not rising. Actors are in general seeking to intervene into the processes of land use in a manner that does not carry the risk of challenges to decisions and organisations involved in the land-use domain. However the control and defence strategies in Germany and England differ. In Germany control relies on a more detailed set of legal regulations, the HWSG. However tight regulations only apply to a limited area and rely on a well-established single risk category that can be defended in public law courts. In England actors rely on more indirect mechanisms of control including monitoring and reporting on enforcement, centralised risk mapping and detailed a 'practice guide' elaborating the implementation of risk-based national policies.

In short the cases of Germany and England cast doubts upon arguments that actors in charge of land-use regulation adopt risk-based regulation in order to achieve 'better regulation'. They also show how the

use of risk in land-use regulation serves different purposes and that they play out in different ways in Germany and England. But how can the differences be explained?

## 6.5 EXPLAINING VARIATIONS IN RISK-BASED LAND-USE REGULATION

The following sections discuss major contrasts between Germany's and England's institutional contexts that help explain differences in the two countries' divergent ways of organising its land-use domains. The discussions will focus on the variance in the use of risk in the domains due to its assumed central role in the emerging risk-based land-use regulation domains.

### *5.5.1 State structure: Federalism versus 'dual polity'*

Germany's Federal government focuses on addressing the regulatory deficit at Länder level whilst England's EA concentrates its control activities on local planners. This variation points to the importance of the structure of the state, which distributes responsibilities and shapes interactions between its different levels.

In Chapter 5 Germany's Federal state structure was identified as an important factor that shaped the fragmentation of risk assessment and thus created a barrier to 'neoliberalisation' in the flood defence domain. In the land use domain the Länder' responsibility for flood and land management has been suggested as resulting in regulatory deficits in terms of development control for flood risk areas. In response the Federal level used its legislative responsibilities to constrain the discretion of Länder legislators and subordinate enforcement authorities.

However the extent to which the Federal level can impose its regulations onto the states is limited. The Federal government has to consider Länder interests because of the joint decision-making in legislation (giving the Länder a *de facto* veto right) as well as its reliance for enforcement on Länder and subordinate administrations. Increased Federal activism since the 1960s has been noted more generally for the field of

environmental policy (Weidner 1995; Lees 2007) and has often been part of an ongoing power struggle within Germany's Federal state with its interlocking responsibilities between states and Federal level (Scharpf 1988; Benz 1999; Scharpf 2005). These interlocking relations in Germany's Federal state therefore limit the scope and form that the 'regulatory state' takes across the whole *Bundesstaat*.

More concretely the increased legislative activity by the Federal government was far from uncontested in the field of flood management, with Länder considering challenging the relatively detailed prescriptions for land use in USGs in front of the Constitutional Court. The Länder refrained from this step in view of the public salience of flood management after the 2002 floods, which created a political context in which it was unpopular to challenge measures that improved flood management (Berendes 2005; Fassbender 2007). While the Länder did not try to completely block the HWSG the fact that they could potentially block legislation ensured that Federal activism would be limited. One instance already referred to in chapter 4 is the failure of the Federal legislator to introduce a HQ200 reference standard for the production of flood management plans. These political constraints can be argued to have limited the scope to which the Federal level could impose regulations on Länder, thus offering one explanation for the relatively narrow HQ100 boundaries of the regulatory state by the Federal level. Moreover the risk-based standard of HQ100 is also sufficiently abstract to be applicable across the variable geography of river catchments and adjacent land in Germany.

However the dynamics between the Federal and Länder levels are not enough to explain the choice of a narrow definition of the regulatory state. Even the Länder have not taken any steps (with few exceptions[70]) to expand the 'regulatory state' beyond HQ100. This spatial self-restraint of Germany's regulators can be understood in the context of Germany's

[70] Saxony for instance has introduced the concept of 'flood emergence areas' (*Hochwasserentstehugsgebiete*) in which they regulate land use in order to maximise maximum natural water retention (e.g. restrictions on sealing the surfaces).

'protective state' norms as discussed in Chapter 5, according to which the state ensures that the population is safe from flood events occurring more frequently than once in a hundred years. This not only means that defences are built to this standard but also that areas to be inundated by HQ100 floods are being kept free from development. Keeping the HQ100 areas free from development can serve as a complementary mechanism to flood defences for Germany's state to ensure that the population is safe up to the HQ100 standard. It can also be argued to be complementary because Germany's actors acknowledge the effects of state-provided safety through defences by adopting the HQ100 as the boundaries of their restrictive regulatory state and by taking for granted the effectiveness of flood defences. Finally, as the earlier discussion of Germany's risk-based land-use regulation shows, regulators have also been constrained by the possible interventions of administrative courts. This factor will be discussed more extensively below.

In England responsibilities are conventionally assumed to be organised in a centralised manner as reflected in its flood regime through the dominant position of the EA. However in the land-use regulation domain the idea of a unitary state has to be treated with caution. In fact Jones called Britain more generally a 'unitary, highly decentralised' country well before the devolution under New Labour (Jones 1990). This characterisation refers to the relations between central government and local authorities. Knill and Lenschow (1998) note that:

> "there is no hierarchical control or inspection of local authorities' day-to-day activities by central government, implying high variation of local authority performance throughout the country" (1998:4).

The complete absence of control postulated by Knill and Lenschow is too strong an assumption. Ever since the 1980s (with Margaret Thatcher in power) the central government has tightened control over local authorities through a proliferation of national planning policies – a trend intensified under the planning reforms inaugurated by New Labour (Clifford 2008). That notwithstanding, local authorities are not embedded in a hierarchically

structured public administration. Combined with the fact that local councils are directly elected this implies a substantial autonomy for local actors. This applies in particular for local planning authorities. Pottier and colleagues suggest that planning belongs to the 'acknowledged and undisputed fields of local self-determination' (Pottier, Penning-Rowsell, Tunstall et al. 2005:9). As one local planner stresses:

> "we are the elected organisations charged with looking after and regulating our areas" (Local Planner South Holland 2009, interview).

This fragmentation implies that flood management through land-use regulation is dependent on the interventions of local planners and is beyond the direct control of the Environment Agency. The absence of a direct means of control partly explains the use by the EA of risk information and risk-based proceduralisation as an indirect means of governance (Miller and Rose 1990; Power 2003). This indirect means of control also makes central interference with local affairs within such a relatively large territory (HQ1,000) politically more acceptable to the local level.

### 6.5.2 State structure: Rational bureaucracy versus regulatory agencies

The second set of factors that shapes the choices of actors and the varying forms of regulatory state in the two countries' flood regimes again relates to the structure of the state of the two countries. However rather than focusing on different levels of government this section explores the internal organisation of the executive.

In Germany the internal organisation of the public administration is hierarchical and law-based. While the latter aspect will be discussed in the next section on operating principles, the former one points to a coherence in the state organisation in contrast to the fragmented image of the Federal state. Kuhlmann (2010) notes that Germany's administration can be seen as part of the classical continental model of bureaucracy. More specifically the bureaucracy is:

> "largely moulded by the ideal-type Weberian model of classic bureaucratic organisation characterised by steep internal hierarchies, highly specialised institutional structures, and marginal scope for corresponding responsibilities" (ibid.:1119).

Planners at the local level in Germany are integrated into this 'rational bureaucracy' and are constrained in their decision-making by relatively detailed plans provided by regional planners that concretely delineate areas with restrictions as well as the evaluation of planning decisions by specialised water authorities. This embeddedness explains the local planners' sense of being 'cornered' when making planning decisions for 'inundation areas' (Local planner Dresden 2009, interview) and the confidence of Länder-level administrators that the restrictive regulations within USGs will be applied at local implementation levels (MWME 2009; SMUL 2008, interviews).

The contrast to England's regional planning in particular is remarkable: England's equivalent to regional plans, the Regional Spatial Strategies, give significant discretion to local planners. In the words of a planning officer:

> "an RSS is not precise in terms of location. It is only precise in terms of numbers. What the regional plan would say for South Holland, would be the number of houses to be built over the next years. (...) This has to be seen in the context of the responsibility for local affairs by local authorities" (Local Planner South Holland 2009, interview).

Similarly the central government's planning ministry emphasises that:

> "planning is not dictated from above. We from DETR never tried to take away the power from local planning authorities [LPAs]. (...) We accept that local interests may under some circumstances override [national interests]. But if LPAs do so, it had to be justified. That they looked at the national policies, and considered them" (DETR/DCLG 2009b, interview).

This reference to the need for justification underlines the indirect means of control applied by central government actors *vis-a-vis* local planners in the

absence of a more direct hierarchical control as found in Germany's Weberian bureaucracy.

The need for some indirect means of control is further reinforced by the particular status of the EA as a semi-autonomous public body. In the Parliamentary discussions about a stronger role (in particular a veto right over planning decisions) for the EA *vis-a-vis* local planners in the aftermath of the Easter 1998 floods, an official of the EA noted:

> "you trespass on an interesting area politically, which is quite difficult, a non departmental public body having the right of veto over elected councils over where development should happen. It is a difficult one" (SCA 1998: Question 81).

The creation of semi-autonomous public bodies and regulators has been part of a wider institutional development that was initiated under Margaret Thatcher's Next Step programme in the early-1990s (Knill 1999). While such regulators and agencies have also proliferated in recent years in Germany (e.g. the Federal Network Agency (*Bundesnetzagentur*) – regulating domains such as electricity, telecommunication, gas, postal services and railways (founded in 2005) – flood management and land-use regulation is primarily managed through a hierarchically-organised executive with Landes environment agencies often serving in a purely scientific advisory and information-providing function.

This institutional status of the EA is also interesting from a regulatory state perspective. First, one prominent feature of the 'regulatory state' is the existence of independent regulators outside the departmental hierarchy in which expertise can be concentrated and the state commits with credibility and time-consistency to particular policies (Majone 1994). This is associated with a greater problem-solving capacity and can be argued to imply the rise of technical instruments such as risk maps.

Secondly however, the earlier discussions of England's land-use regulation suggest that risk instruments serve control purposes. This need for control in turn arises due to the expected blame following major flood

disasters. The concern of the EA to be exposed to blame is a result of its peculiar position as a semi-autonomous agency with wide-ranging responsibilities in flood management. In fact scholars discuss the establishment of autonomous agencies as a blame-shifting strategy by policy-makers (Hood 2002). In Germany responsibilities for land-use regulation are much more diffuse across organisations and territory (local and regional planning and water authorities), implying a more difficult and localised assignment of blame.[71] DEFRA as a government department overseeing flood management policies puts a greater emphasis on accountability in the 'Making Space for Water' strategy and thereby acknowledges the importance of blame attribution. In its 'Making Space for Water' strategy:

> "There will be transparent and measurable targets and performance indicators, in terms of managing risks to people, property and the environment, to ensure that those responsible for delivering the strategy can be held account for" (DEFRA 2005:15).

These targets are in turn directly linked to the EA. In the words of a DEFRA official:

> "we have been transferring a lot of responsibility from the department to the Environment Agency. (...) And we set High-Level Targets and Outcome Measures that relate to the programmes of the Agency" (DEFRA 2008, interview).

In view of this exposure to institutional risk the EA's endorsement of risk instruments to expand and improve control over local planning decisions (as well as to communicate that there is no safety from flooding) becomes much more understandable.

[71] The infamous case of Röderau-Süd near Dresden illustrates the complexity of the institutional arrangements. The local authority of Röderau obtained permission to develop Röderau-Süd by the regional planners in Dresden in 1992 during the post-unification construction boom in Eastern Germany. The development was permitted even against the advice of local environment authorities (Local Environment Agency Radebeul) because Saxony's Environment Ministry simply declared the area to be off-floodplain. Intriguingly while a court case (due to danger to life) could have been made against the involved authorities the property owners were simply bought off after the 2002 floods with the promise of a state-funded resettlement (Spiegel, 04.08.2003).

### 6.5.3 Styles of administration: Legalism versus managerial administration

Another factor that has significantly been shaping the choices of actors within Germany's land-use domain has been the prospect of a judicial review of restrictions on land use. The importance of this review reflects Germany's constitutional principle of the *Rechtsstaat* (Article 19.4 of the Basic Law). The *Rechtsstaat* means most notably that any public administrative intervention and operation needs to be based on a legislative rule and is subject to judicial review through the public administrative (*Verwaltungsgerichte*) and ultimately the constitutional court systems (*Verfassungsgerichte*).

Commentators on Germany's environmental policy have pointed to the formalism and juridification of its policies and have as well observed that Germany is the European leader in statutory, codified environmental regulation and has achieved a large density of environmental legal regulations (Weale 1992; RSU 1994; Weidner 1995). This codification of Germany's policies and administrative measures dates back to pre- and semi-democratic times underlining the historical entrenchment of legal rule-based state action (Schmidt 2008). Knill (1999) concludes that the comprehensive body of public administrative law provides a 'rigid backbone' of constraint for state authorities, with binding legislation prescribing most aspects of the decisions and measures by public authorities.

One of the key rationales for the legalism underpinning administrative operations in Germany is that of protecting citizens from disproportionate state interventions and restrictions. Any intervention that implies (potentially disproportionate) restrictions on the freedom of citizens therefore is to be based on legislation and can be challenged in administrative courts. In order to avoid the annulment of the measures or compensation payments to the affected citizens, interventions therefore need to be based on clear and stable legal categories and take into account the state-provided safety. This is reflected in the bifurcation in the

restrictiveness of regulations between the clearly defined and unprotected 'inundation areas' and vaguely defined and often protected 'flood-prone areas' as well as the planners' hesitation to integrate the latter areas into administrative practice for fear of legal challenges.

Such an extensive body of public law upon which public interventions can be based and reviewed is absent in England. The PPG and PPS25 are not formally binding legislation but offer non-binding guidance to local planners. That notwithstanding local planners should take these national policies into account when making development plans and taking individual decisions. Violations of such policies can lead to an appeals process that is for the vast majority of cases handled through the Planning Inspectorate (PINS). If PINS cannot resolve the issue the Secretary of State from the planning ministry DCLG is called upon to decide. A final appeal against the Secretary's decision can be brought to the High Court of Justice that offers the ultimate venue to appeal planning decisions. The appeals are decided by individual inspectors trying to balance the opposing interests and policies relevant to an individual case. As one inspector notes, in highlighting the variability and flexibility of England's review process:

> "we inspectors evaluate the discretion that local planners exercise. Different people, planners, inspectors, evaluate different things differently. PPGs do not provide a ranking order among themselves. [In most cases,] a lot of different national policies are relevant. And for some policies, proposals comply, for other cases partially comply and for some others, they were against the policies. So what each individual inspector does, with his own experiences in mind, is to decide which policies and which degree of compliance is really important" (PINS 2009, interview).

The review process organised through PINS examining non-binding guidance therefore appears to be much less of a concern in terms of institutional risks for the actors in England's planning system than the more formalised judicial review through Germany's administrative courts. Individual appeals may be lost to developers but no abstract, widely applied

legal categories – such as 'flood-prone areas' and associated regulations – are being reviewed.

The discussion of institutional factors shaping the 'regulatory states' in the land-use domains of Germany and England's flood regimes sheds light on the different ways in which regulatory states can be organised, how risk is used to organise relations between central/Federal state actors and lower level governments and serves the purposes of central state control, and also how the use of risk is constrained and driven by aspects of state structure and operating procedures.

The regulatory state in Germany seems to be neither rising nor in any way 'better regulated'. Rather it is spatially limited to the threshold of state-provided safety – that is it reinforces the image of the state as protecting the population against flood events with a greater probability than HQ100. Preventing development between river channels and HQ100 boundaries (often coinciding with HQ100 flood defences) through tight regulation does not necessarily replace but rather complements the infrastructure state in the pursuit of providing security to the population. Germany's complementary 'regulatory state' does not make systematic use of the risk instruments' potential to better target regulations in order to better the 'regulatory state'. This is not only a consequence of the implicit HQ100 safety promise but also owes to the weight of potential legal challenges of restrictions in Germany's *Rechtsstaat* that constitutes the institutional risk of annulment and compensation payments for the regulators.

The regulatory state in England looks much more as might be expected from the literature. An increasingly important actor is an autonomous regulatory agency. Regulatory interventions 'smartly' take into account different levels of risk. Moreover the effects of flood defences associated with the interventionist state are ignored in key risk assessments. However while the literature assumes improved problem-solving and a lower regulatory burden on users of flood risk areas thanks to risk-based targeting and expert-driven regulation the concepts and instruments of risk

are also used as indirect means of control over autonomous local planners that is used mostly by the EA to communicate the uncertainty of protection and avoid blame.

## 6.6 CONCLUSIONS

This chapter started off with 'better regulation' arguments about the use of risk in the land-use regulation domain. These arguments' main concerns are that regulations fail to achieve their particular purposes, mostly due to excessive restrictiveness. Within flood regimes land-use regulation needs to strike a balance between preventing asset accumulation in areas at flood risk and not stifling the economic utility of floodplains. To achieve these goals proponents of 'better regulation' may point to the benefits of risk-based regulation. The concept and instruments of risk help in identifying the boundaries of the areas that should be subject to regulations and allow for differential treatment within these areas depending on varying levels of risk and vulnerability.

The discussions of Germany and England raise questions about the validity of arguments that propose that the use of concepts and instruments of risk in regulation is mostly motivated by a 'better regulation' agenda. These questions emerge because first, Germany's risk-based regulation is *de facto* concentrated on a single flood zone, within which regulation is extremely tight and beyond which regulations do little to control the accumulation of assets. This binary form of regulation is very different from the risk-based regulation envisaged by 'better regulation' advocates. In contrast England's risk-based regulation closely resembles the regulatory state shaped by 'better regulation' ideas of varied and targeted interventions. Second, however, in both cases the use of risk in the land-use domain is shaped by concerns of involved actors about their capability of regulating land use in flood risk areas. In Germany's case there is a concern on the one hand, about the judicial review of planning decisions among actors (for example on Landes and local levels) within the planning system that convert legal concepts such as flood-prone areas into administrative interventions.

On the other hand, there is also a concern about the deficit of legal regulations on Länder level among Federal lawmakers. England's central government flood managers use risk to exercise control over autonomous local planners whose prior planning decisions can (partly) be blamed for the asset accumulation in areas at flood risk. Local planners in turn use risk instruments to justify their planning decisions *vis-a-vis* developers.

Which factors are responsible for these deviations from 'better regulation' goals for land-use regulation? Germany's case shows that certain features of its institutional configuration interfere with risk-based 'better regulation'. Germany's protective state fits well with the idea of ruling out developments in unsafe, i.e. unprotected areas because such a stringent regulation makes sure that the state keeps its safety promise (by preventing settlement in HQ100 areas rather than protecting up to HQ100). At the same time the protective state struggles to acknowledge the uncertainty in the safety provided by the state. The German *Rechtsstaat* makes regulation of land use beyond HQ100 difficult because it requires that interventions into individual (property) rights are justified – for example by arguing that they are necessary for the safety of an individual. In the *Rechtsstaat* interventions also need to be based on clear, legal categories such as HQ100 as the historically grown safety standard for flood defences. In short cognitive, normative and procedural barriers to the use of the concept and instruments of risk to achieve 'better regulation' with more variable risk-based interventions that 'smartly' address the problems of asset allocation in areas at flood risk can be found for Germany's case. Risk (most notably the term of HQ100) is used to define the boundaries of the 'regulatory state' in this domain in a manner that reflects the power and interests of actors at Federal and state levels within the context of Germany's *Bundesstaat* (Federal state). At the same time it remains compatible with the idea of a state that protects its population against most disasters and the procedural and normative requirements of Germany's *Rechtsstaat*.

England's case underpins the arguments about the barriers to better regulation made for the German case. In the absence of the legalistic requirements of the *Rechtsstaat* and its protection promise risk instruments reflect the uncertainty of safety, and interventions vary along risk and vulnerability levels. However the motivation behind the adoption of such risk-based regulation is not to strike an optimal balance between precaution and the economic utilisation of flood risk areas. Rather the key user of the concept and instruments of risk (the Environment Agency) uses risk as an indirect means to exercise control over autonomous local planners in order to reduce potential damage from flood events (the more damage the greater the blame to be allocated after the disaster) and to (help local planners) fend off potential challenges of developers when their proposals are rejected.

The 'better regulation' agenda can be argued to have a strong appeal to actors within the land-use regulation domain of flood regimes. This is because the involved actors need to balance the objectives of precaution and economic utilisation – and risk-based regulation can help avoid too tight or too loose restrictions for areas at different degrees of risk. However in Germany's case the institutional foundations of the state compel actors to regulate extremely tightly (in inundation areas) and extremely loosely (beyond HQ100). England's case, on the other hand, shows how risk-based regulation may help actors in a particular institutional context to reduce their own institutional risk.

## CHAPTER 7: DISASTER FINANCING, INSURANCE AND MARKET FAILURES

Disaster financing is about both 'treasure' and 'regulation' but does not discuss them exclusively as government tools. Rather, insurance emerges as an alternative private mechanism available for providing compensation and regulation.

More specifically, disaster financing can be organised privately or publicly (even though there are also some hybrid models, in particular for disaster insurance). Organised privately, damages from flooding are remedied individually or through private third parties, in particular the insurance industry. If financed publicly, the state steps in and makes compensation available to the victims of flood disasters. This chapter takes a special interest in collective disaster financing mechanisms, reflecting the insight that the damage caused by natural disasters often exceeds the capacities of individual households and small businesses. While desirable in view of the scale of damage, transferring the responsibility for disaster financing from individuals to collective actors is also problematic. Relieved of financial risks, individuals may disregard or even exacerbate their exposure to flooding, a phenomenon normally linked to the concept of moral hazard.

Private insurance has been propagated by a number of commentators (Harrington 2000; Priest 1996) as the most effective collective mechanism for assuming individual risks and reducing overall financial risks. This resonates with neoliberal arguments, since these are not only about a retreat and reconfiguration of the state but also the superiority of market and private corporate mechanisms for managing risks. Over the last two decades, these ideas have also been put into practice. States have deregulated financial institutions and markets, and have promoted individual responsibility for risks faced by individuals (Rose 1996). In terms of risk management, the advocates of market mechanisms have criticised public insurance mechanisms (such as social insurance) that have been challenged as

fostering a ‘culture of dependency’ and leading to the erosion of individual responsibility (Aharoni 1981). Private insurance, in contrast, makes use of the price mechanism and contract terms to signal the level of risk exposure to individuals, thereby turning individuals into ‘agents of prevention’ rather than ‘immoral’ risk-takers (Ericson, Doyle and Barry 2003). At the same time, the dismantling of public insurance has attracted criticism. For example, it has been interpreted as a scheme by the more affluent that would get better contractual conditions and services on the private market. Their withdrawal from the public insurance pool would undermine the viability of public insurance scheme (Rosanvallon 2000; Garland 2003).

Commercial flood insurance is available in Germany and England and has been acknowledged to be essential for private flood risk management by key state actors within the two countries’ flood regimes (LAWA 2004; ABI and Government 2008). More generally, insurance markets have been deregulated across Europe (when the Third Non-Life Insurance Directive (EC 1992) became effective in 1994). At the same time, public social insurance systems (for instance, Germany’s Hartz IV reforms under the Schröder government or the rise of means-tested welfare benefits in England under Thatcher’s government) have been trimmed in many European countries. Is there a discernible trend towards market-based disaster financing in Germany’s and England’s flood regimes? Do the market-based mechanisms accomplish the tasks of disaster financing, that is the pooling and reducing of financial risks?

These questions are closely related to the availability and role of the concept and instruments of risk within flood regimes. This is because risk calculations are essential for private insurers to manage financial risks. In a nutshell, insurers rely on assessments of probable annual and total losses to build sufficient capital reserves and of individual risks to price risk transfer in a manner that creates incentives for the insurers’ (prospective) clients to reduce damage potential. This ensures an efficient pay-out of compensation

and an overall reduction of damage potential. Are risk instruments developed and used for these purposes in the two countries' flood regimes?

The chapter begins with a discussion of the particular challenges different forms of disaster financing face, and how risk instruments are deemed essential to overcome barriers to organising this domain efficiently. The next section analyses how disaster financing is organised in the two countries. This is followed by an analysis of why insurance markets fail both to compensate and regulate in these two countries.

## 7.1 THE NEED FOR AND CHALLENGES OF DISASTER FINANCING

Recent flood events in Germany and Britain have led to record economic losses from flooding, easily exceeding one billion EUR and GBP respectively[72]. These aggregate damage figures actually conceal the tragedy of flooding for affected individuals and businesses. An expert from the major British insurer Aviva estimates that the average flood claim would be between GBP 10,000 (~EUR 15,400[73]) and GBP 15,000 (~EUR 23,200) (Stevenson 2003). Pohlhausen (1999) assumes average damages of DEM 10,000 (~EUR 5,100) to 30,000 (~EUR 15,300) for German households. These are large sums of money for individual households and small businesses to absorb, and they reveal that substantial financial resources must be mobilised to remedy the adverse impact of flood disasters – along with measures that help reduce flood damage.

The previous chapters 5 and 6 have highlighted how measures in the flood defence domain (aiming at preventing damages) and land-use control (using regulatory interventions to reduce accumulation of values in areas at risk) do not always achieve their flood management objectives. Interventions in these domains therefore need to be complemented and can even be partially replaced by measures of disaster financing. In terms of damage prevention, disaster financing can ameliorate the adverse consequences of

[72] An overview over damages caused by flooding in Germany and England follows in section 7.2 and 7.3.
[73] Calculated on the basis of historical exchange rates.

flood damage on the material well-being of individuals through financial compensation financed collectively through taxpayers or insurance collectives. In terms of regulating 'risky' value accumulation, actors providing compensation can make this post-disaster financial support conditional upon compliance with certain regulations, including the payment of varying insurance premium rates (attaching a certain cost to particular activities, such as locating a house on the riverside) or particular building measures (e.g. elevating the ground floor or banning oil tanks in basements).

Most simply put, there are two general challenges to organising collective disaster financing. The first challenge is that as much as individual financial capacities can be overwhelmed by the scale of natural disasters, collective mechanisms can also struggle to cope with large-scale compensation demands. One example for such difficulties has been the insolvency of nine insurance companies in the United States after hurricane Andrew in 1992 (Kunreuther 1996). Another involves the budgetary and economic consequences of state-provided compensation, as argued by Schwarze and Wagner (2004) for the case of the substantial state support paid out in the aftermath of the Elbe 2002 floods.

The second challenge concerns the risk-taking behaviour of individuals and organisations. More specifically, the problem of moral hazard emerges once the consequences of one's actions are borne by another party. Concretely, moral hazard has often been used to describe the fact that once insured, individuals behave more negligently and/or are more risk-taking than if they were uninsured (Arrow 1971). This points to a potential trade-off between the 'social' objectives of disaster financing (helping overwhelmed individuals) and the 'regulatory' goals (discouraging risk-taking behaviour by restricting access to financial compensation). This kind of 'moral hazard' is not only an issue for individual insurance clients but also for organisations. One example is insurers themselves, for example when they are bailed out after a major disaster such as 9/11 (Ericson and Doyle 2004b). Even the government may act immorally if another party

shoulders the financial risks associated with a particular course of action (Huber 2004).

How does risk help in coping with these challenges? The concept and instruments of risk offer solutions that ensure that adequate financial means are in place, and that moral hazards are being managed. In the domain of disaster financing, actors not only take an interest in risk instruments that show the distribution over land of different water quantities but in particular in the material effects of the water on buildings and infrastructure. To this end, probabilistic modelling of flood events, focusing on probability of occurrence, can be combined with records of economic losses associated with different water quantities (e.g. claims data from insurers) to calculate damage potential curves[74] that can be overlaid on maps of current land uses and actuarial exposure to estimate expected annual losses for different land uses. On this basis, actors providing disaster financing can anticipate the claims for compensation that they can expect annually and in a worst case scenario. This allows them to build adequate financial reserves, avoiding the opportunity costs associated with building too large reserves and the transaction costs that go with mobilising resources for rapid recovery at short notice in case of insufficient reserves. Risk instruments are therefore necessary for an efficient organisation of risk spreading across space and time.

The actors can also estimate differences in the probabilities with which different areas and values are affected. This makes it possible for them to design access to compensation in a way that reflects different levels of risk and is conditional upon specific risk-related behaviour. Through variable pricing and conditionality, activities – such as constructing a house in an area at great risk from flooding – that potentially result in major damage are to be avoided, and those that have limited potential for damage

[74] Such calculations use depth-damage function. These functions express a mathematical relationship between the flood water depth and the amount of damage that can be attributed to that water.

should be encouraged. Risk calculations are therefore instrumental for controlling moral hazard and regulating human behaviour.

This way of using risk instruments is often argued to be found in disaster financing systems based on private insurance markets and industry (Ewald 1991). Insurance-based systems are credited for their efficient and reliable delivery of compensation, based on the terms and conditions of insurance contracts. Insurers are argued to benefit from substantial loss assessment, claims management and risk assessment expertise (SwissRe 2002; Jongejan 2007).

Moreover, it is argued that insurers make contributions to reducing damage potential (Priest 1996). They do so, first, on the basis of their ability to aggregate different 'risks' (i.e. clients) which enable them – on the basis of the Law of Large Numbers – to improve predictive accuracy. Second, insurance-based compensation is based on the mechanism that insurers collect regular premiums from a large number of clients before an event so that insurers can compensate affected individuals after an event. Before assuming the financial risk of future flood events on behalf of their clients, insurers therefore normally define the (contractual) conditions under which this risk transfer takes place, segregating the aggregated risks again into subpools with different risk levels. With the aid of risk-assessment instruments, insurers can require different groups of prospective clients to pay risk-adequate prices for their risk transfer and to undertake risk-mitigating measures.

An important alternative to insurance-based financing, namely public disaster relief and compensation in the aftermath of an event[75] is often

[75] The mechanisms discussed are, on the one hand, inspired by the mechanisms in use in Germany and England. On the other hand, another mechanism that could be in place is the use of ex-ante national disaster funds. However, this is not considered because it is likely to be much less common. Reserving public money for rare events such as flooding (remember the flood-free phase between 1950 and 1993 and the safety standards in Germany) is politically problematic. Another option would be disaster financing through the use of the judicial system (through Tort law). However, this requires a clear allocation of responsibility and blame. This is difficult in flood management because of the causal complexity of flood events and the formally limited (or shared with the public)

presented as the inferior approach to disaster financing (Priest 1996; Harrington 2000). In the case of ex-post public disaster aid, scholars have raised questions in respect of the ability of governmental disaster financing to provide means for recovery efficiently and incentives for risk mitigation. On the one hand, the capacity of government aid to assist recovery has been questioned because pay-outs in the aftermath of a disaster are uncertain and unpredictable in terms of their amount, timing and distribution and rely often upon unwritten moral rights and political expediency as well as inexperienced staff for loss adjustment and claims management (SwissRe 2002; Schwarze and Wagner 2006). On the other hand, government aid is distributed on the basis of post-disaster needs and damages and in the name of solidarity in an emergency (Klimaszewski-Blettner and Richter 2007). The flipside of this orientation is that behaviour before the disaster – for example where and how a building is constructed – is not taken into account when compensation is paid out. Rather than setting economic incentives that sanction certain types of risky behaviour, ex-post government aid shields individuals and organisations from the adverse financial consequences of activities that increase their damage potential (Schwarze and Wagner 2004). State compensation is subject to the democratic principles of inclusiveness and political opportunism that make it difficult to manage moral hazard (Priest 1996).

Given the suggested superiority of market-based financing mechanisms in achieving social and regulatory objectives, its endorsement in Germany and England's flood regimes should elicit little surprise. In Germany, the state-Federal working group on water issues, LAWA (1995), highlights the important role of flood insurance as part of a precautionary approach to reduce the impact of flood disasters:

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responsibility of governmental actors (see the 'contingent' role of England's state and the responsibilities of the individual to take precautions in Germany's WHG §31a). Finally, it is crucial to note that the aforementioned mechanisms aim to provide *collective* solutions to disaster financing because this thesis studies the governance of flood risk. However, financial risks are – to varying degrees – retained by the individuals.

> "Without the protection of elemental insurance which also covers flood risk, all investments in structural flood protection and the promotion of individual precaution remain incoherent" (ibid:18).

From the German insurers' perspective, insuring flooding opens new opportunities on a potentially profitable market. An expert from the reinsurer Deutsche Rück notes:

> "our objective as an industry is to expand the market penetration for our Elemental Damage Optional Insurance product" (Deutsche Rück 2008, Interview).

Defra, Britain's Environment Ministry, has jointly with the Association of British Insurers (ABI) – issued a statement that:

> "both want that flood insurance remains as affordable and widely available as possible so that consumers and small businesses continue to be able to protect themselves from the financial cost of flooding" (ABI and Government 2008).

This endorsement of insurance-based disaster financing can be found not only in policy documents but also in corporate practice. Commercial insurers in both countries typically offer flood cover as part of bundled packages. In England, flood cover is a part of the standard all-risk building and home content insurance policies whilst Germany's Elemental Damage Insurance (*Elementarschaden-Zusatzversicherung*) – covering flooding, earthquake, snow storms, and volcano eruptions – can be added as an option to property and home contents packages.

While there are arguments for the superiority of insurance solutions in risk management, the establishment of disaster insurance markets is not a common phenomenon. In many cases the state assumes an important role as regulator or reinsurer of the disaster insurance markets. One example of a market with regulatory interference is the property insurance market in hurricane-prone Florida. Here, the state – in addition to providing residual insurance cover to those not served by private insurers (Klein 2008) – regulates premium setting, which in turn affects the supply of private insurance because the regulated rates are often perceived as non-adequate for

higher risk levels. In France and Spain, governments act as reinsurer of last resort through the *Caisse Centrale de Réassurance* and *Consorcio de Compensacion de Seguros* respectively. Similar financial and regulatory interventions can be found in many European countries (see Prettenthaler and Vetters 2004 for an overview of flood risk insurance). In Germany and England, however, the governments do not formally interfere with the insurance markets.

The state interventions in other European countries have to be seen in the context of the discussion of insurance market failures. Scholars highlight barriers to establishing a working disaster risk insurance market and point to the possibility of market failures (Kunreuther 1996; Froot 1999; Moss 1999). Whether these accounts are relevant for the cases of Germany and England where commercial flood insurance markets are largely unregulated will be discussed after exploring the extent to which markets have indeed assumed a central role in the disaster financing domains of the two countries. If not, how and why does the role of commercial insurers vary, in particular with regard to their use of risk instruments and their interactions with the government as a potential alternative provider of disaster financing?

### 7.2 EXAMINING RISK IN GERMANY'S DISASTER FINANCING

Market-based solutions to disaster financing through private insurance on a national scale are a comparatively recent innovation in Germany's flood regime. The aforementioned Elemental Damage option has been introduced into the market as recently as in the early 1990s. Prior to this, flood cover was part of a mandatory home insurance offered only in the state of Baden-Wurttemberg by two regional insurers that held the monopoly over specific areas of that Land.[76] In the other Länder in western Germany, private

[76] Germany's insurance system used to be (before the EU deregulation in 1994) organised in two tiers, commercial and monopoly insurers. For centuries (e.g. the *Hamburger Feuerkasse* since 1676), the insurance of buildings was organised as regional monopolies and compulsory insurances. However, while most monopoly insurers offered natural disaster policies, these only covered hail and storms. The exception were the *Badische Gebäudeversicherung* and the *Wurttembergische Gebäudeversicherung* whose natural disaster policies included flooding, avalanches, snow, and earthquake.

insurers did not offer any coverage for flood damage. Under the GDR, households in Eastern Germany were insured through a state-owned, national non-life insurer.

These insurance arrangements, however, changed in the early 1990s. Many of the policies of the GDR's non-life insurer were taken on by Western German private insurers. In 1991, Germany's insurance regulator, at that time the *Bundesaufsichtsamt für das Versicherungswesen* (BAV), allowed private insurers to offer products that covered elemental damages. However, market access was initially restricted by regulations to those areas in which no regional monopoly insurers offered coverage (i.e. outside Baden-Wurttemberg). This practice was changed when the aforementioned Third Non-Life Insurance Directive became effective on 1 July 1994 requiring the deregulation of the monopolistically organised regional markets.

In parallel with these wider changes to the insurance market, the government has also become increasingly involved in disaster financing, most notably in the aftermath of the 1997 Odra flood and the Elbe 2002 floods. The following sections demonstrate the role of risk instruments within this public–private organisation of disaster financing.

### 7.2.1 Detecting: Assessing varying exposures to flood risk

'Detecting' in the domain of disaster financing is important for predicting potential aggregate and individual compensation needs so as to assess exposure, build adequate reserves, charge appropriate premiums and thereby encourage individuals to mitigate flood risk. Actors in this domain therefore are interested in flood mapping and zoning, damage potential assessments, and aggregate loss calculations for events with varying probabilities. What is notable about Germany's detecting is that even though both the insurance industry and government are involved in disaster financing, it is only the insurance industry that collectively and substantially invests in risk mapping

and modelling for the purposes of disaster financing rather than the government.

Early assessment explicitly related to the needs of disaster financing was undertaken only by Germany's insurance industry, not by state actors. These early assessments used for elemental damage underwriting relied on qualitative-descriptive tools, such as home-owner questionnaires in which the history of flooding and its material consequences for a particular building was enquired about (Falkenhagen 2005). The data obtained through these methods was, however, poor as questionnaires were often not filled in completely and the local and historical knowledge was not always available to the owner. Moreover, flood risk assessments available to the insurers from governmental actors were deemed inadequate for insurance purposes, primarily due to their fragmentation along administrative boundaries that would undermine consistency in exposure and premium calculation (GDV 2008c, interview). As an expert from Germany's association of insurers (*Gesamtverband der deutschen Versicherungswirtschaft*, GdV) notes:

> "we as the insurance industry told the LAWA a hundred times to improve their data provision and gathering" (GDV 2008a, interview).

In the aftermath of the 1997 Odra flooding and its substantive economic damage, the insurance industry jointly undertook a nation-wide flood risk assessment project, resulting in the instrument 'Zoning System for Flooding and Extreme Rainfall' (ZÜRS), which first became available in 2001. The development of ZÜRS was undertaken as a joint project, led by the GDV because 'it would be too expensive for an individual company to do this by itself' (Deutsche Rück 2008, interview). As this activity suggests, the GDV is more than simply a trade association concerned with political lobbying or representing the interests of the industry *vis-a-vis* the government, consumers, and other interest groups. It collects and analyses damage data from its members, and generates best practice and standards for its members. As such an association, it is allowed by competition authorities to produce technical instruments such as risk assessment tools as long as

they are ‘competition-neutral’ (that is, the instruments do not favour particular groups of companies by selectively providing such instruments).

ZÜRS basically is a flood hazard map. It allows insurers to locate the properties of their (prospective) clients in different flood zones, differentiated by the probabilistically-defined boundaries of HQ10, HQ50 and HQ200. With the support of this new industry-wide assessment tool, industry representatives estimate that approximately 80% of areas could in principle be insured against flooding (Hauner 2004:61; Schwarze and Wagner 2004). ZÜRS has assumed a central role in assessing flood risk for Germany’s insurance industry:

> “ZÜRS is the standard for the German insurance industry – and there is nothing beyond that. There is also no interest by individual insurers to do something different because they all back this product financially and technically” (Deutsche Rück 2008, interview).

Combined with the specific insured values of individual properties and home contents, ZÜRS’ probability zones help insurers to price insurance cover adequately in view of varying risk levels.

The pattern of insurance-led, collective risk assessments is not restricted to the development of flood maps. It also includes the so-called ‘HQkumul’ project, which was completed jointly by seven reinsurers and the GdV in 2008 and delivered a probabilistic flood model covering the entire country and providing information also about the cumulative exposure of insurers and reinsurers to losses from flooding. In contrast to ZÜRS (which informs insurers about probability of inundation), HQkumul – as produced by the GDV for primary insurers – combines probabilities with the GDV member data on damage to produce damage functions for the different insurance segments affected by flood events (e.g. building insurance). With such ‘detecting’ capacity in place, insurers are in principle able to assume the ‘compensatory’ and ‘regulatory’ function attributed to insurance-based disaster financing.

Compared to the private insurance industry state actors have undertaken limited activities to assess the financial risks they face from flooding. Apart from making the data produced for their own purposes (that is to determine floodplains and the safety levels for flood defences) freely available to the insurance industry because 'only if the insurers know the risk, can they insure it' (SMUL 2008, interview), state actors have done little to consider the financial risks they face. They do not make use of available risk instruments (e.g. the Rhine Atlas with its damage potential assessment) even though public disaster relief and compensation has played a significant role in some recent flood events, most notably the 2002 flood event at the Elbe. In the aftermath of these 2002 floods, the Federal government – jointly with the Federal states – set up the so-called *Aufbauhilfefond* (reconstruction aid fund), a special fund by Federal government and states (Bundesregierung 2003). The information requirements for the financing of the damage of 2002 were limited. Affected individuals – with the aid of engineering companies – made claims about damage that were used as the informational basis for the compensation, taking into account compensation already provided by insurers.

The pattern in 'detecting' reinforces the aforementioned arguments about public and private solutions to disaster financing. Private insurers, through their heavy investment in risk assessments, gather the information required to build adequate reserves and control moral hazard. Public disaster financing, however, faces compensatory demands and regulatory needs in a state of limited informational preparedness. The pattern therefore underlines arguments about the superiority of private solutions to disaster financing while the increased engagement of the insurance industry in 'detecting' supports arguments about shifts to private governance. Does this superiority mean that most of the disaster financing in Germany is organised through the commercial insurance mechanism?

### 7.2.2 Directing: Standards of insurability and financial risk distribution

Disaster financing in general pursues the objective of aiding economic recovery from flooding without increasing (or even better while decreasing) its damage potential. Directing is about defining responsibilities for the financial risk from flooding between state, insurance market and individual, whether by setting standards for 'insurability' or descriptors of events that trigger public disaster aid. The most notable aspect of 'directing' in Germany's disaster financing domain is the absence of any formal regulation and standards that define who bears what financial risks.

This absence of regulation applies, on the one hand, to disaster financing through the commercial insurance market. Rather than being regulated in terms of pricing and the provision of flood insurance by the state or through mechanisms of self-regulation, underwriting decisions about availability, pricing and conditions of flood insurance in Germany are shaped by market signals and commercial factors, such as individual insurers' portfolios, capital reserves, access to reinsurance, and competitive position. Even though co-ordination in 'detecting' through the industry body GDV occurs, there is no co-ordinated approach to underwriting and insurability. While the joint risk assessment tool ZÜRS informs underwriting of flood insurance in Germany as a uniform, industry-wide technical instrument, it does not, however, exclusively determine it or provide the basis for binding standards. Indeed it does not even provide non-binding guidance concerning insurability and pricing insurance products. As survey data collected by Thieken and colleagues after 2002 suggest, ZÜRS is being used in combination with each insurance company's data on insured values and further input to determine availability and pricing of insurance products (Thieken et al. 2006).

On the other hand, particular rules and standards are also absent in the determination of public disaster aid and compensation. There is no concrete legal obligation for the Federal government or Länder governments

to provide disaster compensation. Constitutionally, it is the Länder that hold the primary responsibility for flood management and disaster management (‘*Katastrophenschutz*’) in Germany’s Federal state. Consequently, they are also the first ones to become involved in disaster financing. However, once the disaster assumes ‘supra-regional’ (*überregionale*) dimensions, the Länder can ask the Federal government for support. The issue with this threshold rule is, as an official of the Federal Ministry of Finances notes, that:

> “the definition of ‘supra-regional’ is not codified but based on experiences” (BMF 2008, interview).

Consequently, allocation of responsibility and access to public disaster financing are influenced by political considerations and determined through negotiation rather than probabilistically-defined rules or thresholds for intervention. This can be illustrated by the state compensation that was paid out in the aftermath of the 1997 and 2002 floods. The Federal government got involved in the Odra 1997 floods through a transfer of €250 million to remedy the damage and reinstate defence infrastructure. The Federal Chancellor at that time, Helmut Kohl, visited a disaster-struck area and promised that everything would be rebuilt in the way it was. It was a purely ‘political decision that surprised all experts’ (LfUG 2008, interview). As an expert from Saxony’s Environment Agency notes, the prime minister of Brandenburg at that time:

> “Matthias Platzeck, told Kohl that as he promised reinstatement, he will also need to pay for it” (LfUG 2008, interview).

This is not the only example of politically negotiated disaster financing in Germany. A similarly ‘political’ decision was made by Kohl’s successor, Gerhard Schröder, in the aftermath of the Elbe 2002 floods, to mobilise €3.5 billion from the Federal level and €3 billion from the Länder governments through an Act jointly decided by the Upper Chamber (the *Bundesrat* with Länder government’s representatives) and Lower Chamber (the *Bundestag* with directly elected MPs).

In the absence of any explicit statutory duty to provide public disaster financing, policy-makers have substantial discretion in case of an emergency. Decisions concerning disaster financing are determined by political variables, such as an imminent election. Unlike commercial decisions of insurers, these political calculations about the provision of public disaster financing are not informed by ZÜRS and calculations of expected annual losses or other formal assessments of risk. In fact, an attempt to introduce a mandatory insurance scheme with rules and responsibilities for private and public shares in disaster financing, informed by a risk assessment of the probable maximum losses for the elemental damages, failed in 2004. In the aftermath of the 2002 flood event, the Federal Ministries of Justice and Finances, as well as the Conference of the Finance Ministers of the Federal States (*Finanzministerkonferenz*, FMK) approached the GDV to develop a proposal for a mandatory private insurance scheme – an initiative driven by the experience of the costly, large-scale financial aid in the aftermath of the 2002 Elbe floods. Under the proposed scheme, homeowners would have been required to purchase insurance whilst insurers would have been obliged to offer insurance products on a risk-oriented basis (i.e. with premiums that reflect different levels of risk). The scheme would also have implied that the government stepped in as an insurer of last resort. Based on the GDV's risk assessment of probable maximum losses for elemental damage, the public reinsurance would have had to cover losses exceeding EUR 8 billion up to the probable maximum loss of EUR 30 billion, with the first EUR 8 billion covered by the private insurance market (Hauner 2004).

However, the negotiations within the responsible working group of Federal and state level governments were discontinued in 2004 from the side of the Länder's finance ministers. They were concerned that the proposed scheme was an undesirable formalised commitment to potential financial risk (the liability for the potential EUR 22 billion exceeding the threshold of EUR 8 billion) in contrast to the currently unregulated engagement in disaster

financing without any formal commitment and would have faced the problem of how to allocate the financial burden between the Federal and state levels (Riedel and Hofmann 2004). Apart from the financial risk and the problem of negotiating the allocation of financial risks between the different levels of government, Schwarze and Wagner (2006) point to political benefits of distributing compensation after disasters that makes politicians reluctant to reduce their discretion in disaster financing. Finally, policy-makers were concerned about whether a mandatory scheme would be reconcilable with the constitutionally protected contractual freedom.

In short, the absence of regulation is reconcilable with the idea of a market-based disaster financing. Disaster financing is also provided by the German state. State-provided disaster financing without risk-based regulation makes financing contingent upon political factors. As the next section will show, this political contingency potentially undermines the regulatory and compensatory functions of disaster financing.

### 7.2.3 Effecting: Compensation and behavioural change

'Effecting' in disaster financing has two aspects. First, it is about the distribution and delivery of compensation payments after an event. Second, the economic incentives of the prospect of post-disaster financial compensation can be employed to shape human behaviour in a way that reduces the potential for economic losses from flooding.

In terms of compensation payments after flood events, Germany's 'effecting' underpins arguments about the superiority of private insurance mechanisms. Although systematic data is rare, the victims of flooding seem to be satisfied with the loss compensation services of insurers. As a survey undertaken by Thieken and colleagues (2006) suggests, 75% of the insured interviewees (n=424 insured households in the Elbe catchment area of Saxony and Saxony-Anhalt) were very satisfied with the flood loss compensation. While 67.5% of insured households received compensation of at least 50% for their losses, full loss compensation was paid out in the case

of 25.9% of the insured households. The mean loss compensation of the insured households amounted to EUR 23,749. These figures underpin arguments about the efficiency of loss compensations by insurers.

The government's contribution to improving financial resilience can be described as potentially restricted. Thieken's previously mentioned survey (2006) also collected data from uninsured households after the Elbe 2002 flooding. He collected data from uninsured households that relied on government aid. Here, only 32.1% of households (n=389 uninsured households) received compensation covering more than 50% of the flood damage and only 10.3% got fully compensated. Moreover, only (albeit a still impressive) 60% of households were very satisfied with the flood loss compensation. The mean loss compensation of uninsured households stood at EUR 12,540.[77]

While these figures more concretely show the shortcomings of public disaster financing, the following table 11 illustrates which collective disaster financing mechanisms contributed what share of the total flood damage compensation.

| Event | Total economic damage | State | Insurers | Other sources |
|---|---|---|---|---|
| **1993 Rhine, Germany** | USD 600 million* (~GBP 405 million) | Tax credits for reconstruction** | USD 180 million* (~GBP 122 million) | |
| **1995 Rhine, Germany** | USD 320 million* (~GBP 205 million) | Tax credits for reconstruction** | USD 130 million* (~GBP 83 million) | |

[77] Note that the mean total flood damage for the categories of insured and uninsured households only varied by EUR 936 so that differences in the total damage does not account for the differences in the mean compensation.

| Continued | | | | |
|---|---|---|---|---|
| **1997**<br>**Odra, Germany** | USD 360 million*<br>(~GBP 216 million)<br>[DEM 38 million for Brandenburg***]<br>(~GBP 13 million) | EUR 250 million**<br>(~GBP 150 million)<br>[DEM 5 million for Brandenburg ***]<br>(~GBP 2 million) | USD 35 million*<br>(~GBP 21 million)<br>[DEM 9.5 million for Brandenburg***]<br>(~GBP 3 million) | [DEM 22 million in Brandenburg through private donations***]<br>(~GBP 8 million) |
| **2002**<br>**Elbe & Danube, Germany** | USD 11.6 billion*<br>(~GBP 7,486 million) | EUR 6.5 billion**<br>(~GBP 4,130 million) | USD 1.8 billion*<br>(~GBP 1,161 million) | The state contribution includes EUR 185 million (GBP 118 million) from the EU Solidarity fund**. Saxony alone also received private donations of EUR 0.6-0.7 billion (GBP 381-445 million) (incl. working hours and other non-monetary donations)**** |

**Table 11: Disaster financing of selected flood events in Germany**

All data in original values

* MunichRe, GeoRiskResearch, NatCatService; ** Federal Ministry of Finance 2008 – interview; *** Environment Agency Brandenburg 2009, interview; **** Government of Saxony (Sachsen 2005)

The table underlines the relatively limited role of insurers in financing damages, with a two-fifths share in compensation at the 1995 Rhine floods being the largest proportion of total economic damages carried by the insurance industry. It also shows the variable engagement of government, with massive outlays for the 1997 Odra and the 2002 Elbe floods but a limited role in the 1993 and 1995 Rhine floods. The reasons for this variability can be argued to be political, with imminent elections and the popularity of solidarity (as reflected in the large private donations) with the new Eastern German states being important factors driving political decision-makers.

The availability of public and private disaster financing also has significant implications for the second function of this regime domain, namely discouraging 'immoral' behaviour and encouraging behaviour that reduces the damage potential of flooding. The performance of insurers in terms of regulating behaviour is not particularly impressive. The insurance-based mode of disaster financing makes a limited contribution to regulating behavioural and socio-economic processes. Its contribution is based on the differentiation of premium levels based on the ZÜRS zoning system. Most notably, the widely applied exclusion of zone 4 (GK4) from cover is a clear price signal to prospective clients. However, beyond this exclusion of very frequently flooded properties (HQ10), the effectiveness of price signals has been questioned. An expert of the insurance industry notes that the:

> "average property premium for supplementary stands at about €100 per annum. Such a low level of premium rates results in incentive problems as rewards and premium reductions for risk mitigation of, say, €10 are not really an incentive" (Deutsche Rück 2008, interview).

An alternative mechanism for structuring insurance contracts is the introduction of a deductible or excess. A deductible means that a certain amount of the damage has to be borne by the insured before the insurance company steps in to cover the excess costs. By requiring those insured to bear some of the initial costs of flood damage, a deductible provides an

incentive for the insured to take precautionary measures. However, as a survey among German insurers (n=25) undertaken by Thieken and her colleagues (2006) shows, Germany's insurers use the deductible in a relatively static way and fix it at about 10% of the insured value – regardless of locations of the properties in zones with different risk levels. The same survey also presents data that reflect the limited availability of financial rewards (14% of the sample) insurer-provided information (25-35% of the sample) to their clients about private risk mitigation measures (such as flood-proofing technologies like flood gates or flood-resilient methods like tiled floods or elevated electrical points that reduce damage).

For both functions of disaster financing, the financial/social and regulatory, it is very important to bear in mind the limited size of the flood insurance market in Germany. Elemental damage supplements for property insurance stood at 5% of Germany's building stock while home content policies covering 10% of the building stock included the supplement (Hauner 2004; Schwarze and Wagner 2004). In view of the small scale of flood insurance in Germany, the effects of insurance-based economic incentives are necessarily limited (Schwarze and Wagner 2004), as is their total contribution to improving the financial resilience of potential victims (see Table 7.1 above). The reasons for the small scale of insurance-based financing will be discussed more extensively in section 7.4.

In terms of regulating behaviour, state compensation is provided regardless of risk levels after the damage has occurred. Reflecting these limitations, Germany's most prominent case of public disaster financing, the 2002 floods, reinforces this impression as the government made a promise that:

> "no-one should be worse off than before the flood" (Gerhard Schröder, 26th August 2002[78]).

[78] Press conference in Magdeburg, Germany, 26th August 2002.

The discussion of Germany's disaster financing domain illustrates that the supposedly superior market-based disaster financing is not an inevitable choice for disaster financing. Germany's flood insurance market is of a relatively limited size. This also explains the marginal role of risk instruments in this domain. More specifically, where compensation is organised through insurers, formalised, industry-wide risk assessment instruments play an important role in determining insurability and premium rates. Beyond the realm of insurance-based disaster financing, concepts and instruments of risk are not being used. This raises questions as to the substance of political interest in insurance-based solutions and the barriers to establishing insurance markets.

### 7.3 Examining risk in England's disaster financing

The origins of England's current, insurance-based approach to disaster financing can be traced back to the early 1960s. Flood cover for home contents can even be dated back to as early as the 1920s. However, as Arnell and colleagues (1984) note in their review of the evolution of flood insurance in England, underwriting in this early phase of flood insurance was not a business line that was promoted actively. In fact, clients asking for cover were treated with suspicion. In the aftermath of the 1952 flood event affecting Lynnemouth, English insurers generously provided compensation, mostly as a public relations exercise, although they were not contractually obliged to do so. After the 1953 East Coast flood, however, which caused significantly more damage, insurers were not as generous as to pay compensation beyond their contractual obligation. The resulting public outcry led to calls in Parliament for the establishment of a government fund to finance disasters. This was – according to Arnell and colleagues (ibid.) – rejected by the government that argued that it would impinge on the viability of the insurance market and that it was fundamentally the responsibility of individuals to protect themselves against natural hazards.

Following another flood in 1960, the demand for a national disaster fund resurfaced as insurance compensation was perceived as too limited. The plan of setting up this fund, however, was averted by an informal gentlemen's agreement between the British Insurers Association (BIA, now Association of British Insurers (ABI)) and the government. Through this agreement, the insurance industry committed to offer flood cover for an affordable, standard rate. 'Only in exceptional circumstances where continual, regular flooding was unavoidable' (Salthouse 2002:71) would insurers consider withholding cover or apply especially loaded terms to reflect the higher risk of flooding. In return, the government was obliged to provide 'sufficient' flood protection – though the terms of sufficiency remained unspecified (Huber 2004).

Further calls for state-provided national funds in the aftermath of subsequent flood events (1968, 1970) were rejected with reference to the wide availability of private flood insurance. Insurers, however, were criticised for not promoting the product sufficiently and for offering opt-outs, and agreed in response with the Building Society Association that flood cover should be required for loans and mortgages. During the 1970s, flood cover was included into their standard all-Risk household content and property insurance policies (Arnell, Clark and Gurnell 1984).

This arrangement continued to operate throughout the 1980s and 1990s. The floods of Easter 1998 and Autumn 2000 however, led the industry to reconsider the arrangement. The reconsideration resulted in a moratorium of two years during which insurers expected the government to overhaul its system of flood management while leaving flood cover unchanged but subject to review. This had become necessary in view of increasing losses and the prospect of future climate change, as well as the government's inadequate investment into the maintenance of existing defences and regulation of land-use. In the words of a press release by the ABI,

> "insurance against flooding is provided in virtually all homeowners' insurance policies. The UK is one of only a handful countries throughout the world where this is the case. However, climate change, ageing flood defences, and some property developments are increasing the risks and costs of flooding. The Government needs to take action to ensure that flood cover can remain generally available" (Press release ABI 2002, quoted in Huber 2004:11).

In response to these industry concerns and subsequent lobbying, the informal gentlemen's agreement from 1961 was replaced by the publication, in late 2002,of the so-called Statement of Principles (ABI 2002). In it, the ABI lays out its commitment to continue providing insurance and the conditions for the insurability of flooding, including quantitative, risk-based thresholds (the HQ75 standard) and qualitative demands concerning the government's flood management measures. The following sections discuss the emerging arrangements for England's disaster financing in greater detail.

### 7.3.1 Detecting: Assessing varying exposures to flood risk

Britain's insurers began to show a systematic interest in risk assessments for flooding after suffering large losses from the Easter flooding in 1998 and the following floods in 2000. For instance, the market leader Aviva (then called Norwich Union) recognised that:

> "following the flooding in the UK in the Autumn of 2000 which cost Norwich Union within the UK over £200m, our understanding and ability to assess accurately the risk of flooding was not sufficient" (Aviva 2009b, interview).

Prior to these flood events:

> "most insurers (...) within the UK generally did not consider the flood risk as a peril which warranted a great deal of attention. (...) Underwriters could simply assess what was a sufficient premium level for normal weather losses and then adjust based on any large catastrophic provision level. (...) Consequently, the degree of sophistication in assessment and rating used to be far more limited" (Aviva 2009b, interview).

The inadequacy of the insurers' own assessment capacities was complemented by unsuitable publicly available risk data at that time. As an expert from Aviva points out:

> "in fact, it [the Indicative Flood Maps from the Environment Agency] was not created for insurance purposes but primarily for local planning and to get a general overview over flood risk in the UK" (Aviva 2008a, interview).

In response to this perceived inadequate risk assessment, Aviva launched its own flood mapping project in 2002, an initiative that was soon followed up by other companies (Crighton 2002). Aviva's maps distinguish seven probability bands (Aviva 2008a, interview). This was much more comprehensive and nuanced than the data provided by the Environment Agency at that time (namely the aforementioned patchwork Indicative Flood Map (see chapter 5) defining a HQ100 flood zone).

By 2004, however, the overhauling of public flood maps of the Environment Agency was complemented by the government's National Flood Risk Assessment (NaFRA). While also being used for other purposes, as seen in chapter 4, the Environment Agency (EA) provides the National Flood Risk Assessment (NaFRA) to the insurance industry subject only to the payment of a licence fee. NaFRA reflects in important ways the special needs of the insurance industry. First, NaFRA's risk categories use HQ75, set out in the ABI's Statement of Principles as the threshold for 'insurability' (see next section), to distinguish between high (more frequent or HQ75) and moderate risk – in contrast to the Agency's Flood Map which uses the more conventional HQ100 threshold. Second, NaFRA includes data on the performance and status of flood defences, reflecting the insurers' demands for such data. The reflection of insurers' preference in NaFRA is partly a result of the negotiations that took place after the 2000 floods between the government and the ABI about the gentlemen's agreement. As a representative of ABI noted:

> "apart from money, what mattered from the very beginning of the post-1998 negotiations were data. (...). The principle was always that 'without adequate data, flood insurance cannot be offered'" (ABI 2008, interview).

The government in turn developed NaFRA, as it was interested in complying with some of the demands of the insurers in order to ensure continued flood cover through private insurance (see the discussion in chapter 5).

In short, while government agencies provide data as well as some basic risk assessment tools such as NaFRA, the major private insurers individually produce their own maps. Insurers also resort to private rather than public risk instruments when it comes to probabilistic flood models by risk modelling consultancies such as Risk Management Solutions or EQECAT. These models normally require the input of an insurer's portfolio, and produce loss exceedance curves that allow individual insurers to anticipate capital and reinsurance needs. From the viewpoint of Britain's insurers, the presence of multiple models is perceived favourably. As a report by a UK insurance expert group on flooding elaborates:

> "reinsurers and insurers are likely to take the view that use and/or development of a 'better' solution than their competitors can be advantageous to their business. (...)The use of a single solution may in fact be disadvantageous, since the presence of varying results from the different models can lead to a greater variety of insurance pricing in the market" (Lowe, Barnett, Black et al. 2008:52)

It is therefore no surprise that commercially produced risk assessments become increasingly relevant to England's insurance industry. The authors of the GIRO working group paper report an increasing interest among reinsurers and insurers in probabilistic risk modelling, in particular in the aftermath of the summer 2007 floods (Lowe, Barnett, Black et al. 2008:30). In contrast to Germany's shared, 'competition-neutral' risk assessments, England's insurers perceive risk assessment as part of the competitive process.

### 7.3.2 Directing: Standards of insurability and financial risk distribution

England's insurance market provides most of the compensation to affected households and commercial entities. Does that mean that the market largely determines the prices for risk transfer in England, as seen in the case of the insurance-based component of Germany's disaster financing? Surprisingly, for England's market, specific standards and rules concerning disaster financing have been set through the so-called Statement of Principles in 2002, which took effect as of 1 January 2003 (ABI 2002).

The SOP, issued by ABI on behalf of its members, defines a threshold at which insurance continues to be available in England. If a property is protected up to HQ75 flood events, the owner is guaranteed that insurance will be available for it. This original version of the SOP was revised regularly after negotiations and reviews of ABI and the government. The HQ75 standard remained in place but the scope of its application became increasingly restricted. In 2004, ABI offered guidance for new developments and stipulated that:

> "minimum level of flood protection which would enable insurers to make cover available for *new* residential properties is at least HQ200 up to the year 2050" (ABI 2004d:4).

The HQ75 standard therefore no longer applied to new developments. This tightening of access to insurance for owners and companies embarking in new developments was further reinforced in the latest, 2008 revision of the SOP, which excludes all new properties built after 1st January 2009 from the insurers' commitment to provide coverage (ABI and Government 2008).[79]

[79] While this controls for a further growth of financial risks for insurers, figures on the housing stock and its change over time shows that commitment to insure existing houses protected against upto HQ75 floods is still substantial. The 2010 total housing stock (provisional estimate) for England is 22,564,000. Ten years earlier, there were 1.6 million houses less (*annual* growth rate of <1%). See live tables on housing stock, table 104, retrieved from http://www.communities.gov.uk/housing/housingresearch/housingstatistics/housingstatistics by/ stockincludingvacants/livetables/ on 26/10/2010.

The steady tightening of the threshold for insurability suggests that individuals retain some of the risks and/or need to seek alternative risk transfer mechanisms (e.g. pressurising the government for relief). However, while insurers are no longer bound by an informal agreement concerning new developments, the SOP leaves it to the individual insurer to provide insurance. The discussion on 'effecting' will show how the insurers continue to offer affordable insurance even in high-risk areas (>HQ75).

However, this insurability threshold is not the only rule that determines risk transfers from individual house owners and commercial entities to insurers. The SOP spells out additional, mostly qualitative conditions that concern the activities by the government and individuals to mitigate and manage risks. In its earliest version, for instance, the SOP outlined a long laundry list of industry demands for the government, including a significant increase in flood defence investments; the implementation of the Planning Policy Guidance 25 (including compliance reporting); improved flood defence planning in accordance to Defra's defence funding review; better flood warning and emergency planning; and measures concerning sewerage flooding (ABI 2003). In the latest 2008 revision of the SOP, the conditions concerning government action have shifted towards better flood information, the implementation of a long-term strategy for flood management, promotion of flood awareness and access to insurance, and the prevention of inappropriate developments in flood risk areas (ABI and Government 2008). In addition to 'regulating' government activities through setting regulatory, financial and informational 'thresholds' concerning government activities, the insurers also suggest to individual household owners in order to ensure continued access to insurance cover and should embark on a 'better use of new solutions to make properties insurable' (ABI Press release 2002, quoted in Huber 2004:16).

### 7.3.3 Effecting: Compensation and behavioural change

In England's market-based system, private insurance companies have the primary responsibility for meeting loss adjustment claims. But after a major flood disaster this can be a major challenge. The summer 2007 flood event, for example, led to 180,000 claims, the equivalent of four normal years' claims made in the space of just a few short weeks (Pitt 2008). A survey undertaken on behalf of the Pitt review team among insured households affected by the floods (n=582) shows that 72% of surveyed households were satisfied with how their claims were handled while a minority of 22% were dissatisfied with how long the house repairs took and the poor insurance information and advice they obtained. Of all claims, 90% were concluded nine months after their submission. Overall, the review considers:

> "the insurance industry to have generally responded well to the summer 2007 floods, having been presented with one of the biggest ever challenges" (ibid:xxi)

The importance of the insurance industry in improving the financial resilience of individuals is also reflected in the proportion of total economic damage covered by the insurance industry after the series of recent major floods in England. The following table 12 provides an overview.

| Event | Total economic damage | State | Insurers | Other sources except the affected |
|---|---|---|---|---|
| **1998**<br>**Multiple rivers in England, Britain** | USD 400 million*<br>(~GBP 245 million) | Some emergency relief and funding for local authorities through Bellwin scheme[80] (GBP 0.44 million) *** | USD 250 million*<br>(~GBP 153 million) | N/A |
| **2000**<br>**Multiple rivers in England, Britain** | USD 1.7 billion*<br>(~GBP 1,173 million) | Some emergency relief and funding for local authorities through Bellwin scheme (GBP 4.1 million (including support for flooding but also plane crash and unexploded bomb)) *** | USD 1.1 billion*<br>(~GBP 759 million) | N/A |
| **2007**<br>**Multiple rivers and surface water flooding in England, Britain** | USD 4 billion*<br>(~GBP 1,982 million) | GBP 57 million**<br>(Bellwin scheme of GBP 19 million****) | USD 3 billion*<br>(~GBP 1,487 million) | N/A |

**Table 12**: Disaster financing of selected flood events in England

All data in original values

[80] Since its inception in 1983, the Bellwin scheme is concerned with emergency financial assistance from central to local government in Britain. Assistance can be claimed if immediate action to safeguard life and property are to be undertaken in the area under the control of a particular local government.

* MunichRe, GeoRiskResearch, NatCatService; ** Association of British Insurers (2007); *** JSCCB 2003, Annex A; **** Parry 2009

As table 7.2 illustrates, the industry's contributions range between three-fifths and three-quarters of the total economic losses whilst government contributions, as far as data are available, are very limited (about 3% of the total economic damage in 2007). Losses are often mostly in the form of immediate emergency help to the local authorities (the Bellwin scheme). A significant proportion of the losses has also been borne by the victims, as a result of underinsurance and no insurance (Pitt 2008).

While England's insurers substantially contribute to the financial resilience of individuals, their regulatory effectiveness is limited. In principle, as England's disaster financing is predominantly insurance-based, insurers have substantial scope to incentivise risk mitigation among clients. However, a recent report (Lowe, Barnett, Black et al. 2008) by the GIRO (General Insurance Research Organising Committee) working group on flooding surveyed the availability and pricing of flood cover by 24 insurers in February 2008. One of the most notable results of this survey is that even within NaFRA's 'significant' HQ75 risk category, 19 out of 24 insurers provide a quotation for cover in spite of the high risk and the withdrawal of the commitment to ensure under the new renewed SOP. The differences for mean prices between properties located 'off floodplain' and within HQ75 risk areas is just GBP 52 per annum; the mean premium rate for significant risk is GBP 320. If an insurance prospect aims at the cheapest available premiums, the price difference between HQ75 risk areas and off-floodplain location shrinks to only £6; the HQ75 risk areas' premium rate stood at a low GBP 170 per annum. There is therefore little financial disincentive to settle in areas at high flood risk. The report also refers to the instrument of deductibles. As in Germany, rather than considering the location in different flood zones, these are usually related to the sum insured and to previous claims history.

While the insurers' attempts to adapt individual behaviour through variation in availability, price and structure of flood cover seem restricted, the previous section noted that the insurers also set standards *vis-a-vis* the government and its behaviour through their Statements of Principle (SOPs). As a result of these responses of the insurance industry to the 1998 and 2000 events, financial risk appeared on the government's horizon again. As an officer of HM Treasury notes:

> "we have an interest in the SOP being maintained because otherwise the expectations that the government steps in rears its head and we don't want that because the costs would be significant" (HM Treasury 2009, interview).

It can be argued that at least partly in response to the insurers' demand, flood defence investment was raised, NaFRA was produced and took a particular shape and planning regulations were tightened even though the government never met the requirements of the insurers completely (ABI 2002; Huber 2004; ABI 2005a).

A Treasury official's comments, however, point to a much greater degree of autonomy for the government than could have been expected in view of arguments that emphasise that interest groups with major stakes in a regulation are able to exercise strong influence over the regulator (Wilson 1980).

> "Some of them [the demands of the ABI] Defra can do as long as it is within their budget. But the ABI's demands were double of what Defra spends now—and this is already 1/5 of their budget. So such demand would mean for Defra to stop doing other things or reprioritise. So we have to be involved in that [the SOP negotiations]" (HM Treasury 2009, interview).

As finance and economics ministries are concerned with the budget, the Treasury's involvement has stiffened the resolve against ABI's lobbying. The limited impact of the insurers' lobbying is also reflected in ABI's for higher precautionary standards in other domains and functional areas of flood regimes during the SOP negotiations. In the domain of land-use

regulation, the initial version of PPG25 that was in consultation just before the 2000 floods occurred contained two alternative approaches to managing developments in flood risk areas. One of the approaches, proposed by the insurance industry, emphasised the need to construct defences in accordance with the exposure and vulnerability of particular areas, thus emphasising the idea of providing (though risk-adequate) *safety*. This approach, however, was abandoned in favour of the risk zones approach that aims at moving developments out of harm's way and highlights the uncertainty of protection through flood defences (DETR/DCLG 2009, interview). There have also been limits to industry influence on reforms to the detecting system. While NaFRA is being made available to the insurers (in exchange for a fee) in response to ABI's demands for better risk assessments, the insurers continue to complain about the 'inadequacy' of public risk assessments for insurance purposes, and so continue to feel the need to develop their own risk assessment tools (Aviva 2009a, interview).

The discussion of the organisation of disaster financing in England is puzzling. While the private insurance industry is indeed performing the disaster financing, some aspects of the domain do not match the expectations of a market-based financing approach. In fact, these aspects raise questions as to the alleged benefits of choosing markets over government. First, commercial insurers make limited use of risk instruments for reducing damage potential through behavioural change (the 'regulatory' function of disaster financing). At the same time, they continue to bear most of financial risk (the 'social' function). Insurers therefore seem to be doing little to reduce their financial risk through market-based contractual means and by implication, the overall damage potential. However, by renegotiating the informal regulatory core of the disaster financing domain (the 1961 'gentlemen's agreement') in the early 2000s, insurers at least gradually reduced their commitment to provide flood cover in the 2000s (by defining a risk-based insurability threshold) while trying to pressurise the government into taking measures to reduce the damage potential. This raises a number of

questions concerning the degree to which disaster financing is really market-based in England, and about the legacy of the gentlemen's agreement from the 1960s.

### 7.4 EXPLAINING VARIATIONS IN RISK-BASED DISASTER FINANCING

The organisation of disaster financing in Germany and England provides interesting insights from a perspective that proposes the superiority of market-based mechanisms. Markets in both countries fail in providing both regulatory and social functions that they are expected to perform in a superior manner. However, markets fail to provide efficient outcomes in different ways in the two countries. In Germany, the market failure results from limited market size. As a consequence, financial risks from flooding are also handled by non-specialised actors such as the government, and the price mechanism does not apply for the risk transfer from individual to the state. In England, insurers are the main agent for disaster financing. However, the price mechanism fails to work effectively because of the legacy of informal (self-) regulation of the industry. Both failures have particular implications for the assumed benefits of the superior market mechanism. As depressed demand (discussed below) in Germany and regulation in England limit the effective use of market prices as the allocation mechanism, individuals (and others, as will be shown below) are prone to take more risks than they would have otherwise (moral hazard). Financial compensation is contingent upon political factors in Germany and the question emerges as to whether the 'social' function provided by England's insurance industry may become increasingly unsustainable in view of rising damages.

The following sections focus on understanding why insurance markets fail to function and expand and how this affects the role of risk in disaster financing. The variations in the two countries point to two aspects in the disaster financing domain that shed light on the deviation from superior market mechanisms. In the first section, arguments about market failures are

explored, mostly focusing on the behaviour of private market participants. However, this discussion of why markets work or do not work in different ways in Germany and England already highlights the importance of state–market relations in shaping markets and private behaviour. A second section therefore focuses on state–market relations in the two countries.

### 7.4.1 Market failure: Demand, supply, evolution and institutions of flood insurance markets

Insurance markets can fail for a variety of reasons. One way of ordering them is to look at the two sides of markets, namely demand and supply. To put it rather crudely, if either demand or supply is insufficient, there is no market and no pricing of risk.

On the supply side there may be problems with: the insurer's having insufficient knowledge about a risk (Moss 2002); information asymmetries between insurer and insured leading to moral hazard (the insured knows more about his risk than the insurer) (Arrow 1963); and adverse selection ('bad' risks accumulate in insurer's portfolio because inaccurate risk pricing encourages 'good risks' to leave the insurance pool) (Akerlof 1970), as well as risk correlation and cumulation due to the geographical concentration of flood damage (Gardette 1997).

On the demand side, there are a number of reasons why individual householders and other asset owners do not purchase insurance. One set of reasons is related to misperceptions of flood risk. Kunreuther (2001) notes that house owners underestimate the probability of low frequency events, reflecting findings by Kahneman and Tversky (1979) that highly unlikely events are either ignored or overweighed. Another argument brought forward to explain market failure is related to the role of government in disaster financing, the so-called 'charity hazard'.

In Germany, supply problems appear to be limited. Before the Elbe 2002 floods, German insurers stated that flood insurance would be available for 90% of Germany's territory (Hauner 2004). Schwarze and Wagner

(Schwarze and Wagner 2004) suggest that even though this proportion shrank after the 2002 event, insurers continued to offer flood insurance cover for most of the country (~80%). The increasing availability and development of risk instruments in the insurance industry rule out most of the informational problems while the problems of cumulation at present are of limited significance – mostly because of the still limited overall exposure to flood risk as a result of the limited uptake of flood insurance in Germany.

This limited uptake, however, points to problems on the demand side. Research has shown that the lack of awareness of flood risk has been argued to be important for Germany's insurance market. Thieken and colleagues (2007) analysed the data from 1,248 households in Saxony and Saxony-Anhalt between April and May 2003. Of the 82% of the insured households without prior flood experience, only 35% knew that they were living in an area at risk from flooding.[81] Of the 88% of the uninsured households without prior flood experience, only 26% were aware of their living in a flood-risk area. Analysing the cases of the Rhine floods in 1993 and 1995, Linneroth-Bayer and colleagues (2001) show that, among other factors such as low-income and Germany's higher income households' preference for self-insurance and precautionary measures, the lack of (historical risk) awareness (in particular among an increasingly mobile population moving into risk areas) is responsible for the relatively limited density of flood insurance in Germany.

Moreover, scholars have also pointed to the issue of 'charity hazard' for Germany. Schwarze and Wagner suggest in their commentary on the financing of the 2002 Elbe flood that:

> "the near certainty of government emergency aid and private donations in the event of a natural disaster will continue to adversely affect the decision of homeowners to insure against natural risk" (2004:161).

[81] Thieken et al. (2006) use the concept of 'flood-endangered zone' without further specification

It is possible to disagree with the 'near certainty' of substantial aid such as the one for Saxony as the limited state involvement in the aftermath of the Rhine floods (1993 and 1995) shows. One indication however, that 'charity hazard' may contribute to the low demand in Germany, is that according to the survey by Thieken and her colleagues (2006) almost every three out of ten of households affected by the floods in 2002 still did not intend to purchase flood cover in spite of the better performance of the insurer in compensating losses. Moreover, while insurers report a spike in demand for insurance right after the Elbe flood event, they also observed that this spike was temporary and limited (ibid.).

The demand-induced market failure in Germany's flood insurance sheds light on a number of issues that are relevant for the discussion of risk- and market-based disaster financing. Due to the lack of demand, insurers only play a marginal role in improving financial resilience and reducing damage potential in Germany. Moreover the generation of risk instruments (led by the GDV) is an attempt to address the problem of insufficient risk information in a relatively novel market, which had initially impeded more proactive marketing of elemental damage products (GDVa 2008, interview). Given the novelty and size of Germany's flood insurance market ZÜRS – a collectively-produced risk assessment instrument –becomes the risk assessment of choice as limited resources are dedicated to the relatively small and specialised market of optional elemental damage products.

In contrast to Germany, England's insurers operate in a flood insurance market with substantial demand. Demand is strong as a result of the requirement by mortgage and other lenders that homeowners need flood cover in order to obtain a loan and of the fact that flood cover had become part of the all-risk standard insurance packages for properties and home contents since the 1970s (Arnell, Clark and Gurnell 1984). This latter aspect directs attention to the supply side. England's flood insurance market has been evolving over decades, even before sophisticated risk assessment instruments became available. This expansion of England's flood cover was

initially driven by a gentlemen's agreement from the early 1960s. It is therefore also based on political pressures and negotiations rather than predominantly on economic and market opportunities. While demand and supply are in place, England's insurers fail to substantially differentiate their prices for coverage of properties with varying levels of risk or even to generally exclude high-risk properties from coverage, so that despite high levels of market penetration, insurance fails to incentivise behaviour change or reduce exposure to flood risk.

The reasons for these constraints on insurance pricing reflect, in part, the particular nature of the resulting expansive, mature and competitive flood insurance market in England. The expansion of the market since the 1970s has been a profitable business for insurers. As an underwriter from Aviva notes:

> "it is a matter of a critical mass and the law of the large number (...). Historically we have been able as an industry to earn enough premium income across the full range of cover provided. (...) We have had enough premiums to make a profit for the majority of years and in a really bad year we can use some of the saved money to help pay for the bad year" (Aviva 2008a, interview).

A (partial) withdrawal from the market in response to experienced and expected losses therefore restricts opportunities for profit and undermines the business model based on a 'critical mass' of clients. Moreover, a withdrawal from the market also potentially worsens the competitive position of individual insurers on the building and contents insurance market in general, because the exiting insurer would offer less attractive all-risk standard policies in the context of a property market in which flood insurance is required by mortgage and other lenders.

Given their experience of and continued interest in commercially benefiting from flood insurance, insurers attempt to improve risk assessments to anticipate losses and gain a competitive advantage. This along with the fact that the ABI, in contrast to the GDV with its technical

capabilities and data access, is a pure interest representation organisation, explains individual flood mapping projects of England's insurance companies.

However, while this sheds light on the motivation of the insurers to remain in the market and improve risk assessments, it is less instructive for explaining why insurers do not use price differentiation to reduce loss potential and regulate risky behaviour. To make sense of this it is important to study the legacy of the original gentlemen's agreement. Beyond underpinning insurance supply, the original gentlemen's agreement also constrained price-setting by insurers. This in turn shaped public expectations with regard to available flood insurance as the next section will elaborate. Given market constraints and public expectations, insurers rather than using price differentiation focus on mobilising the government to reduce damage potential. This underlines the crucial role of state–market relations in England's disaster financing domain that will be elaborated further in the following section.

The contrasts between Germany and England's flood insurance markets are substantial. Germany's disaster financing is a traditional case of disaster insurance market failure as a result of insufficient demand for insurance (Kunreuther 2002). As the state has thus borne a substantial share of the financial risk in recent disasters, disaster financing mechanisms mostly delivered on their social/financial function but failed in terms of regulation and made limited use of the concept and instruments of risk.

England's insurance market does not fail due to a lack of demand or supply. The flood insurance avoids this fate through a number of mechanisms (gentlemen's agreement; agreement with mortgage lenders) as well the market's historical entrenchment. This notwithstanding, the market fails to fulfil its regulatory function. The concept and instruments of risk, moreover, are not only not systematically used for pricing but define an industry-wide standard for insurability. In order to understand this interference with the market and the peculiar role of risk in England's

disaster financing, it is important to scrutinise the state-market relation in England.

### 7.4.2 State-market relations: Political opportunism, insurance pressure and path-dependency

The previous discussion of market failures already highlighted the impact of state activities on the flood insurance market. In Germany, the phenomenon of the 'charity hazard' contributes to suppressing demand for private insurance products. This is interesting because it implies government action that undermines a disaster financing mechanism that potentially carries a limited financial risk for the state. In contrast – if there are no alternative collective financing mechanisms – public expectations are directed at the government for financial support (Moss 1999).

One reason for this risky government strategy is the political benefits provided by public disaster financing (Schwarze and Wagner 2006). These benefits are particularly notable for the cases of ex-post ad-hoc governmental aid in the aftermath of floods at the Odra and the Elbe that had favourable political implications. For instance, the compensation efforts in the aftermath of the 2002 were partly driven by the imminent Federal election in 2002. In the words of an official of the Federal Ministry of Finance, the 2002 disaster financing:

> "carried a lot of political weight due to the imminent Federal elections. Hence, the public paid attention to how the two candidates and other campaigners acted" (BMF 2008, interview).

Such public disaster financing in general seems to have reflected a public sentiment for solidarity, as the scale of private donations after the Elbe and Odra flooding also demonstrated[82].

Another reason seems to be a limited attention paid by politicians to the financial risks from flooding to the government. This is, on the one hand, a

[82] One water and flood specialist from the Federal Ministry of Agriculture argued that this special solidarity may have been caused by the fact that the victims were in both cases Eastern Germans (BMELV 2008, interview).

reflection of the relatively infrequent occurrences of major flood events such as the floods from 1997 and 2002, implying that financial risks are uncertain, infrequent and therefore not on the political agenda for long. This impression is shared by a representative of the insurance industry who describes the negotiations about a compulsory flood insurance scheme in the aftermath of the Elbe 2002 floods as follows:

> "Two years after the Elbe floods, the FMK [Interministerial Conference of Finance Ministers] did not see any need to act anymore. Our model is still on the table, unchallenged. But the ministers lost interest" (GDV 2008, interview).

On the other hand, as the absence of the regulatory core in Germany's public disaster financing shows, there is no formal duty on the government's part to provide financial aid and it is difficult for actors to predict which financial burden they would need to shoulder. In fact, one of the reasons why the post-Elbe negotiations for a compulsory insurance scheme stalled and eventually failed was the inability of the ministers of the Länder and Federal level to find an acceptable formula for allocating the financial share of the state for the proposed financing scheme between the Länder and Federal levels.

Germany's disaster financing emerges as being rather poorly organised. While the prospect of public financial aid undermines the commercial insurance markets for flood damage, this prospect is rather uncertain as a result of the absence of clear duties and allocations of responsibility among different levels of government in Germany's Federal state. It is therefore in the discretion of governments at Länder and Federal levels to assume the financial burden of floods. This suggests that political considerations, such as imminent elections, are determining how the adverse financial consequences of flooding are dealt with.

England's state-insurance industry relations do not undermine flood insurance markets as seen in Germany, but strongly shape the available strategic responses to increased flooding by the insurers. The constraints on

the range of options available shape and weaken the regulatory function of flood insurance markets.

Current state–insurance relations are shaped by the gentlemen's agreement between insurers and the government from 1961. As a consequence of the agreement in its original form, the insurance industry assumed almost all financial risks from flooding without being able to limit exposure through risk-adequate price rises (the 'affordable' standard rate), exclusions ('regardless of risk' commitment) or a reciprocal government commitment to prevent flooding (only a vaguely termed 'sufficient' investment promise). In addition to resulting in an expansive, mature market for flood cover this agreement constrained insurers in their price-setting and relieved the government from potential financial risks. As losses and loss expectations began to rise in the 1990s and 2000s, the industry tried to limit its exposure to financial risks.

These industry efforts can be interpreted as 'path-dependent' (Mahoney 2000; Pierson 2000). The ABI renegotiated and renewed the agreement with the government, now publicised under the label of the 'Statement of Principles' (SOP). The exposure limitation was to be achieved through various mechanisms that uphold the close co-ordination between the government and insurers.

The first mechanism is the setting of the insurability threshold of HQ75 that replaced the 'regardless of risk' clause since the publication of the first SOP in 2002. A uniform, probabilistically-defined standard has two advantages. As the negotiating Association of British Insurers (ABI) represented the industry as a whole, such a standard would not favour any of the insurers in particular. Another advantage is that setting the HQ75 standard publicly also exposes the government to public scrutiny and pressure. As an ABI officer notes:

> "what we actually want to achieve for high-risk areas is that individual house-owners assume control over the things. That they talk to their local authority. To the Environment Agency. Possibly also with their local

> MP. That they make some pressure. That they say: "At the moment, I don't get insurance. My excess is very high. But I know that my insurers is happy to change that if I can prove to them that something is going to be done over the next five years". So we try to mobilise people" (ABI 2008, interview).

The second one concerns what the government is to provide in exchange for not having to face the financial risks from flooding. As the government has indeed stepped up funding for flood defences and reformed land-use regulations, Huber (2004) has argued that the insurers emerge as 'indirect regulators' of government (and private individuals') action. However, the underlying problem with the original gentlemen's agreement, namely the government's moral hazard, continues to be present. The argument made by Huber suggests that since the government has offloaded the financial risk to the insurance industry its incentives to engage in flood management are limited. The attempts of the insurers to 'regulate' the government (through their qualitatively-defined conditions concerning government action for the continuation of coverage) – thereby controlling the moral hazard – have been limited in their effectiveness, as the discussion in the 'effecting' section has suggested. It is important to be cautious about attributing this to pressure from insurers. The insurers themselves complain that:

> "the ABI's SOP does not provide the industry with a great deal of leverage over the government and its policies in relation to, and spending on, flood defences" (Lowe, Barnett, Black et al. 2008:55).

There are two explanations for why the threat of withdrawal has not been providing the insurers with a 'great deal of leverage' in either limiting exposure to losses or spurring the desired government interventions. Both explanations can be linked to the legacy of the gentlemen's agreement. The first explanation has been discussed in the previous section, namely the size, profitability and competition on the long-established flood insurance market that renders withdrawal from the market an unappealing option. The second are public expectations concerning the pricing and availability of flood

insurance. A study by Clark and colleagues (2002) argues that society views insurance as a 'social' rather than commercial process, and so the insurers are seen as assuming a social responsibility to provide a financial buffer from the consequences of floods. Price rises, say the authors, are therefore perceived as a 'social affront' and 'abrogation of duty' (ibid.:18). Huber points out that flood insurance in Britain was seen as a 'social policy successfully externalised to the economy' (2004:7). This 'social' character is also reflected in the view of an expert from Aviva on the reputational risk associated with charging risk-adequate premiums.

> "It is difficult to charge the 'economic premium'. [For some properties,] these could become prohibitively high. (...) One of the main reasons why we cannot charge to full premium is that it would be a PR risk" (Aviva 2009a, interview).

This public perception of insurance as a social process can only be understood against the background of the legacy of the low prices charged for decades under the gentlemen's agreement. England's market-based disaster financing is underpinned by the non-market mechanism of agreements between the government and the insurance industry. This agreement results in a transfer of the financial risk from flooding to the insurance industry – while at the same time directly and indirectly constraining the industry's ability to regulate private and the government's flood management.

Germany and England's disaster financing therefore deviate from the expected endorsement of superior market-based mechanisms. But they deviate in different manners. In both cases however, the role of the concept and instruments of risk in disaster financing is limited – in particular in its use for regulating damage-increasing behaviour.

### 7.5 Conclusions

This chapter begins with the debate of an assumed superiority of market-based mechanisms for solving particular policy challenges. While markets have in general been deemed to be more efficient in providing particular

services to the population than the government, insurance markets and the private insurance industry in particular have recently been discovered as a vehicle through which – via the economic incentives that can be connected to price signals – individual behaviour can be shaped and financial resilience improved. Insurers are professional risk managers and are, at least in theory, not as sensitive to public pressure as an elected government. This allows them to control moral hazard and handle large numbers of compensation claims more effectively than the government. Given these benefits, it seems reasonable to expect that disaster financing in Germany and England should rely on the services of private insurers and the price mechanism of private insurance markets.

The discussion of the cases of Germany and England do raise questions as to whether these arguments in favour of private solutions to disaster financing can be applied universally – and thus also as to whether the proliferation of risk instruments is indeed associated with the rise of private governance in disaster financing. Questions about the universal validity of these arguments arise because first, Germany's disaster financing has for major flood events included government aid to the population for whose distribution risk assessments had no impact at all. Second, in England's case, even though disaster financing is organised by the private insurance industry, risk assessment primarily matters to estimate overall exposure (and much less to determine variable price levels). In short, markets in both countries fail because in both cases, the price (of risk transfer) does not serve as the main allocation mechanism in disaster financing. In Germany, it is only applied to the insurance segment of disaster financing. In England, free price-setting by insurers is formally (Statement of Principles) and informally (public and political expectations) constrained.

Which factors inhibit a market-based disaster financing in Germany and England? In Germany, the market fails because the demand for flood insurance products is limited. Two problems widely discussed in the insurance market failure literature seem to be important for explaining this

demand-side failure – namely, a lack of flood awareness and the behavioural consequences of government interventions. It would be interesting to explore further whether the 'safety commitment' implicit in Germany's flood regime (see chapters 5 and 6) explains the lack of public flood awareness (and political disinterest in organising disaster financing more systematically) in addition to factors such as the low frequency of events. Moreover, 'free' government disaster financing can also be blamed for undermining market demand for insurance cover that comes with a price tag.

England's case shows that demand does not have to be the central problem to insurance markets. The problem of a lack of awareness of flood risk is avoided through making flood cover a standard product (as required for mortgages and loans; as part of the All-Risk house and home content policies). The market fails because commercial insurers are constrained in their ability to charge a premium that reflects different levels of risk. This is largely a consequence of an informal agreement struck in the 1960s that continues to shape expectations *vis-à-vis* the role of insurance within disaster financing (a 'social' rather 'regulatory' role) held by policy-makers and the public, as well as the economics of flood insurance (a very large risk pool allows insurers to handle bigger losses).

Organising disaster financing through commercial insurance markets is therefore not as easy as some advocates for market solutions may wish. Rather, scholars that have cautioned about market failures – in particular for disaster insurance – seem to offer interesting insights into the German case. The English case highlights how important it is to explore the unique institutional settings within countries, including those formed decades ago, for explaining market failures and actor behaviour.

# CHAPTER 8: WHOLE FLOOD REGIMES, INTERNATIONAL CONVERGENCE AND NATIONAL GOVERNANCE STYLES

Flooding is not exclusively managed through either of the governmental tools of 'treasure' or 'regulation'. Nor do flood regimes solely consist of commercial insurance markets with their regulatory and compensatory capabilities. In actual flood management practice each of these governance mechanisms, along with others such as flood warning, contributes to reducing flood risk. This chapter therefore takes a holistic perspective on the regimes and the role of risk within them.

Drawing on the empirical groundwork set out in the three preceding chapters, the analysis here focuses on describing and explaining diversity in flood management so as to challenges to arguments about convergence in flood risk management. Its theoretical perspectives differ from the partial analyses in the preceding chapters. Those chapters focused on arguments about convergence that were most relevant for a particular domain of the emerging complex flood regimes. This chapter's analysis, in contrast, examines pressures for convergence that can be expected to affect each regime as a whole.

Specifically three questions about flood regimes are examined from a comparative perspective. First, do flood regimes converge internationally around a particular use of the concept and instruments of risk? This question draws on the functionalist arguments and the neo-institutionalist discussion about various types of isomorphism that explain the convergence in policy responses (DiMaggio and Powell 1983). The disaggregated empirical discussions of the preceding chapters have already highlighted the fact that the case studies of Germany's and England's flood regimes fundamentally differ in their use of risk in governance. The second question to be asked, therefore, is whether it is possible to identify particular national governance styles across the different domains of each country's flood regime – and if so how such patterns can be explained. These questions lean on the notion of 'national styles of regulation' (Vogel 1986) and associated arguments about

the macro-institutional determinants of such styles. Third, if such 'national styles' are assumed is the use of risk instruments internally consistent across regime functions and domains within regimes – and if not how can the inconsistencies be explained? Each of these questions will be discussed below.

### 8.1 FUNCTIONAL RATIONALITY AND INSTITUTIONAL ISOMORPHISM IN RISK-BASED FLOOD MANAGEMENT

Two types of arguments are discussed in this chapter, complementing previous discussions of 'economic effectiveness' and 'accountability' arguments in chapters 5-7. First, risk is functionally necessary – or at least carries substantial benefits for recently emerging approaches to flood management. Second, risk-based flood management converges as a result of the processes of 'institutional isomorphism' as introduced into organisational theory by DiMaggio and Powell (1983).

The functional argument takes as its starting point the observation of a 'seismic shift' (Werrity 2006) in flood management towards more anticipation and adaptation that was already pointed to in chapter 2. This shift reflects three important insights in the disaster management scholarship (and practice). The first is the recognition that natural disasters such as flooding are beyond technical control, and that flood management should consequently be adapted to – and even take advantage of – the water retention capacity of nature. For instance, one important element of this ecological flood management is to preserve the natural functions of floodplains for water retention (Myers and Passerini 2000; Moss 2007). This ecological focus is an important part of a wider sustainable flood management approach, of which the maintenance and enhancement of environmental quality is a key component (Parker 2000b).

The second insight is that socio-economic processes make very important contributions to the severity of flooding and the success of managing flooding. Scholars since White (White 1945; White, Hudson,

Calef et al. 1958; Mitchell 2003) have recognised that inappropriate socio-economic processes, such as flood-vulnerable construction contribute, to the adverse consequences of flooding and that greater attention should be paid to these processes: through their regulation, through incentive-setting and through information that can ameliorate flood risks. This is reflected in the increasing emphasis on the 'vulnerability' of values and of the population in flood management and in discussions of adequate flood warnings and flood-risk communication (Handmer 1987; Blaikie et al. 1994; Brown and Damery 2002).

The third insight is the recognition of the importance of anticipation for reducing the adverse consequences of future flooding. This implies the move from a reactive, remedial approach to disaster management to one that engages in proactive preventive action based on anticipation (Palm 1990; Bryant 1991; Munasinghe and Kreimer 1991). With technological and scientific progress, however, proactive and preventive measures have become increasingly possible and central. From rare humanitarian disasters flood events have become increasingly 'normal' and subject to governance interventions.

There is therefore a functional argument for international convergence. The use of risk instruments may facilitate the threefold shift, since risk helps revealing the benefits of natural water retention, the importance of social processes and the possibility of foresight. In particular risk assessment instruments have facilitated the shift to anticipatory flood management because of our increased technical understanding and capacity to predict the frequency, nature and consequences of future flood events. Risk assessment instruments have also facilitated the 'greening' of flood management by providing systematic assessments of the probable damage avoided by flood defences, and of the effects of natural water retention capacities on flood risks. These assessments can help in limiting the need for engineered interventions to areas with a high value concentration and limited space for natural water retention. Finally, risk assessment instruments have

enabled the 'socialising' of flood management. This is because risk instruments offer ways of targeting regulations, incentives and information on particular processes and population groups thereby avoiding disproportionate interventions into socio-economic processes that would conflict with liberal democratic ideas of the state and society.

In addition to such 'functional' arguments it is possible to argue in favour of convergence on the basis of neo-institutionalist arguments – or more precisely, the three different types of isomorphism (mimetic, normative and coercive) developed by DiMaggio and Powell (1983). In the case of risk-based flood management such convergence arguments can be underpinned in several ways. The first is by pointing to the programmatic similarities in flood management strategies across different EU member states. Such parallel observations in a number of European countries – among them the Netherlands, England, Germany, and Switzerland – point to *mimetic* isomorphism (that is the emulation of certain organisational forms on one country by actors in another) as an explanation. Becker (2009), for example argues that the high-profile international expert commission HSK (International Commission for Research on Floods of the Rhine River) established to study the Rhine flood management in 1968 first floated the idea of 'making space for water' and that other actors such as the LAWA and Dutch flood managers adopted and elaborated on these initial concepts in search of legitimacy after the two Rhine floods in 1993 and 1995 that cast doubts upon the suitability of an approach predominantly focussed on flood defences.

Second, there are pressures for a *normative* isomorphism in the form of transnational professional networks and idea exchanges – from conferences of environment ministries in the aftermath of the Rhine floods in the early 1990s (see chapter 5) to expert working groups such as EXCIMAP (see chapter 2), from the transnational business activities of flood risk modellers and the biannual meetings of EU member state Water

Directors to transnational river catchment management bodies such as the ICPR.

Third, there are also factors driving a *coercive* isomorphism in the form of supranational water policy initiatives including the Water Framework Directive from 2000 (EC 2000) and most notably the recent Flood Directive (EC 2007) with its explicit endorsement of a risk-based approach to flood management.

In short shifts in flood management theory and practice offer strong arguments for convergence around particular forms of risk-based flood regimes across EU member states based on functionalist and institutional arguments about policy convergence. The proliferation of flood mapping and modelling – as well as the use of the concept and terms of risk in standard-setting and to guide implementation – seem to vindicate such arguments. However as the following sections argue the cases of Germany and England show the limitations of such functional and institutional convergence arguments.

## 8.2 Examining convergence in the flood regimes of Germany and England

Convergence arguments can be challenged in two ways. First, the concept and instruments of risk can assume different degrees of centrality within the emerging flood regimes. Second, the role of risk in the flood regimes diverges because the policy instruments define and use the concept of risk in different ways.

Clearly the role of the concept and instruments of risk within flood regimes in Germany and England gained in centrality, as reflected in the proliferation of risk assessment capacity and the emphasis of its benefits in anticipatory flood management. However a closer look reveals differences in the degree to which risk calculus is used. In Germany risk is marginalised where flood management interventions affect *public* finances. This marginal role is notable in the ‘effecting’ function of the flood defence and disaster

financing domains. In both these domains particular political dynamics interfere with a systematic risk-based allocation of *public* funding – as seen in the post-1997 and 2002 public disaster aid or the *Königsberger Schlüssel* whereas *private* disaster financing through Germany's commercial insurers, by contrast, is strongly shaped by the risk zoning instrument ZÜRS.

In England, there is also a public-private contrast, but it is the opposite to that in Germany. England's *public* spending on flood defences is strongly shaped by the risk instruments NaFRA and the NaFRA-based Outcome Measures that direct central government spending to where flood defences maximise the reduction of probable damage from flooding. In England's *privately* organised disaster financing, however, commercial insurers assume the individuals' financial risks from flooding without fully taking into account in their premium-pricing the different risk levels and the risk-based insurability threshold from ABI's Statement of Principles.

What are the implications of the partially and varying 'marginalised' role of risk in public spending and disaster financing in the two countries? If risk is marginalised actors fail to address resource needs in a manner that reflects the varying risk levels. An example of how the politics of disaster – that is the public pressure on governments to help victims in (financial) distress – leads to a different allocation of financial resources can be given. In Saxony for instance financial resources in the aftermath of 2002 were extraordinarily plentiful (the resource needs of Saxony's flood managers are covered until 2013 (LTV 2008, interview)) so that ambitious and sophisticated flood management measures could be introduced (the flood protection concepts). These measures were the 'envy' of the other Länder who were not be able to achieve similar flood management standards within such a short time-span due to resource constraints (SMUL 2008, interview). An expert from NRW even pointed to ripple effects of the concentration of financial resources in Saxony –namely that it was difficult to recruit flood specialists after 2002 because Saxony had hired most of the qualified experts (LANUV 2009, interview). Moreover, disaster financing that disregards

different risk levels when compensating individuals fails to address the moral hazard that offloading the financial risk from flooding creates. This problem applies to both public disaster financing in Germany and private financing in England.

Yet while risk may be partially marginalised in the 'effecting' of flood defence and disaster financing, risk is of central importance in other regime domains and functions. In these however, distinct patterns can be discerned in the way in which actors design and evaluate risk-based flood management measures and conceptualise risk within the flood regimes in Germany and England.

The first conceptualisation of risk distinguishes whether the concept of risk is mostly concerned with the probability of occurrence (the hazard) or the probable damage (the risk) from harmful event[83]. In significant parts of Germany's flood regime the standards and their implementation are shaped by a concept that concentrates on the hazard of flooding. In contrast England's standards and their implementations are for large parts of the regime also informed by an account of the material consequences of flooding as much as probability.

More concretely Germany's statistical term of HQ100 (describing a water quantity with a statistical average return period of once in a 100 years) serves as key reference value in flood defence and land-use regulation. HQ100 normally constitutes the minimal safety standard for flood defences and the boundaries of 'inundation areas' in land-use regulation. The exception to this focus on hazard in Germany is insurers who consider claims and potential damage data, thus using a wider concept of risk than public flood managers. In England the probable damage from flooding is taken into account extensively by NaFRA and the Outcome Measures (OMs) in flood defence management (which measure avoided damage in the form of 'properties at risk' and in the context of benefit-cost target ratios). The

[83] See chapter 2 for a discussion of hazard and risk in flood management.

Sequential and Exception Tests in land-use regulation provide a tool to direct (relatively more vulnerable) developments away from higher risk zones. Finally, England's insurers take into account the value of properties when underwriting flood insurance for properties (even though they fail to fully consider the probability of the damage). This contrast between Germany and England is interesting because actors in both countries have generated risk assessments that include broader assessments of the harmful consequences of flooding. In Germany actors in both regional case studies – ICPR and LTV – have undertaken damage potential assessments. Though not unheard of, such assessments of damage potential are much less influential in Germany than assessments of the probability of inundation.

The second conceptualisation takes an interest in the degree to which uncertainty is reflected in the concept of risk. As discussed in chapter 3 the history of the concept of risk is one of imposing order and control over the uncertain future. While the 'avalanche' of data that had been collected in the 19$^{th}$ century boosted the ability of statisticians and social reformers to predict behaviour and to exercise control over previously unpredictable (mostly) economic and social processes, critics of statistics and risk calculation highlighted the uncertainty inherent in these processes. A similar juxtaposition can be found in the treatment of risk and uncertainty in the flood regimes of Germany and England. In Germany the concept of risk within the flood regime can be linked to enhanced safety and control. In England there is a much greater emphasis on the uncertainty of control and safety.

More specifically Germany's flood regime uses risk instruments as a means to define the extent of state-provided safety. Flood defence managers assess existing safety levels and determine desirable safety levels (HQ standards) – and financial resources are partly (where allocation is indeed risk-based and if money is available) allocated to accomplish these safety goals. Land-use planners along with water authorities determine, heavily regulate and strictly enforce regulations in unsafe 'inundation areas' (thus

making them safe by eliminating damage potential) but leave state-protected 'flood prone areas' loosely regulated. In the domain of disaster financing however, the German state fails to provide any risk-based financial safety. Risk instruments are not used to define an event of a particular probability (e.g. a *Jahrhundertflut*, HQ100 event) where the state steps in to secure the financial safety of the population. Insurers provide financial safety depending on a range of factors including risk assessments, but also commercial needs and market pressures. As chapter 7 has argued however, the insurers' role in Germany's overall disaster financing is limited.

In England the concept of uncertainty is more pervasive. Flood defence managers aim at reducing the number of properties at risk (Defra's Outcome Measures) rather than defining specific safety levels – and accordingly allocate money to where the greatest risk reduction per pound of investment can be achieved. In planning actors (whenever they follow primarily the EA's EFO map for decision-making) ignore the protection offered by defences when defining flood zones and steer developments to those flood zones where the probability of flooding is expected to be lowest. The domain of disaster financing in England offers an interesting contrast: risk is used to define the threshold HQ75 of financial safety.[84] Existing properties that are safe in respect of HQ75 and higher-probability events have the possibility of acquiring financial safety through insurance cover.

The two distinct conceptualisations of risk in governance point to significant contrasts between Germany and England. These differences are notable for both public and private actors. The following section focuses on explaining this cross-country variance.

[84] Financial safety is an exaggeration because insurance holders will have to pay the deductible by themselves and insurance policies may not be comprehensive enough to speak of financial safety. However there is a certainty for a particular payout if a property and its contents are insured.

These differences in the conceptualisation and use of risk in the flood regimes of Germany and England are suggestive of 'national styles' of risk-based governance. As discussed more extensively in chapter 3, national style of regulation arguments highlight systematic patterns in the rules (e.g. product versus process-oriented restrictions) and procedures (e.g. rule-making in a transparent manner and antagonistically vis-à-vis the regulatee versus secretive and co-ordinated with a regulated industry) for regulating risk issues (e.g. genetically modified organisms and chemicals in food production). The arguments then focus on the macro-institutional context in which regulating actors are embedded as potential drivers of these regulatory choices.

Institutions shape the preferences and incentives of key actors. A focus on the macro-institutional variables as drivers of particular choices by actors therefore seems particularly relevant for comparative cross-country studies where cases with great institutional variance can be expected to result in different regimes in spite of common policy challenges and pressures. In fact the discussions in the chapters 5-7 already point to a number of macro-institutional factors influencing actor choices in each of the regime domains of the two regimes. These factors can be described as macro-institutional because they concern the fundamental organisation of the state and state-society relations within the two countries. The following sections revisit the discussions and findings of these three chapters to examine whether differences in risk-based flood management can be explained macro-institutionally.

### 8.3.1 Structural characteristics of Germany's and England's state

The first variable used to explain aspects of the variance between German and English flood regimes is their respective state structures. This section explores aspects of fragmentation and coherence in the relation between central government and lower levels of government and the organisation of

the executive and administration. Such structural factors have been widely used by institutionalist scholars to explain differences in public policy choices and issues, including discussions on environmental policy (for instance, Lees 2007; Knill and Lenschow 1998), public sector reform (for example Knill 1999), inflation rates (see Cukierman 1992), economic policies and welfare states (e.g. Ferrera and Rhodes 2000).

In a nutshell Germany's Federal polity is fragmented in terms of policy-making but coherent in implementing policies thanks to the organisation of the public administration and the dominant role of water authorities across the regime domains of the flood regime. Policy-making is fragmented because of the fragmented responsibilities for policy-making of governments at Federal and Länder level. Since their responsibilities are often also intertwined the resulting mutual dependence of policy-making at different government levels leads to a search for consensus and the need for negotiation (Lijphart 1984; Grimm 2003) to avoid policy blockage (Scharpf 1988). Moreover as responsibilities are intertwined it is also difficult to clearly assign blame in the event of a policy failure. Schmidt (2005) has argued that actors situated in complex polities pay attention to making policy choices acceptable to other institutionalised actors within the polity. This sharply contrasts with actors in simple polities that seek public acceptance with the aim of gaining the central power position within the polity with few veto points.

Once legislation and policies are agreed in Germany implementation is relatively coherent.[85] There are two reasons for this. First, Germany's public administration is organised hierarchically. As a result, local water authorities and planners, along with Landes authorities in charge of

[85] While the implementation may be coherent in the sense of a uniform standard pursued by the state actors that does not mean that it is always easy. There are a number of procedural barriers; for instance, the *Planfeststellungsverfahren* (evaluation of project plan with participation of the affected community) and the *Raumordnungsverfahren* (evaluation of project from a planning perspective). These offer the public opportunities to voice disapproval of flood management projects such as the construction of dykes and retention basins.

implementing Federal and Länder legislation, are subject to legality, if not substantive oversight by Länder authorities. Even the legality oversight already implies only significant constraints on local actors because of the high degree of codification in Germany's water and environmental policies (Lees 2007). Second, policy-making and legislation (e.g. HWSG), inter-governmental negotiations (e.g. the LAWA) and implementation across the flood regime are dominated by specialist environment and water authorities and ministries. This reflects Germany's *Ressortprinzip*, the principle of departmental autonomy, and ensures that risk instruments are based on the shared professional outlook of water experts.

These structural characteristics have a number of implications for the extent to which actors understand and use the concept and instruments of risk. First, the veto powers of the Länder mitigate against any Federal government-imposed risk-based re-allocation of public resources and costly flood management duties, because it may imply an unequal distribution of costs and resources. The asymmetric consequences of risk-based flood management are a result of the unequal distribution of flood risks across Germany (the Rhine rivers' water volumes and damage potential are much greater than those of the Elbe). The importance of avoiding an asymmetric distribution of costs and benefits of flood management is reflected in the use of the *Königsberger Schlüssel* in flood defence spending – ignorant towards different levels of risk but proportional to the total population numbers in each Land. The choice of a relatively abstract and widely shared safety goal (HQ100) implies uniform duties of flood management (even though the costs for fulfilling these duties may vary significantly).

Second, the administrative boundaries and distribution of responsibilities imply a mismatch between governance and the natural characteristics of water bodies that ignore these political boundaries. An abstract and uniform standard makes it less likely that varying standards for the same river catchment will be found, and defines a minimal safety standard that serves as a key reference value for the protection and

regulations provided by Länder governments. HQ100 therefore also serves as a co-ordination instrument within Germany's fragmented Federal state, where responsibility for flood management is largely held in the capitals of its 16 Länder. Risk instruments are less important for co-ordinating between Landes and local levels since hierarchy, oversight mechanisms and law-based public administration greatly reduces the scope for discretion by local actors. This is most conspicuous in the 'cornered' position of Germany's local planning authorities – in spite of the local planners' general planning competency (the so-called *Planungshoheit*).

Third, the choice of HQ100 across flood defence management and land-use regulation also needs to be seen as a result of the dominance of the environment and water administrations within the flood regime reflecting the principle of departmental autonomy in government and the traditional fragmentation of environmental policy-making along natural media (water, soil, air) (Lees 2007). This dominance leads to a concentration on the probability of particular water quantities in conceptualising risk, because of a 'shared professional outlook regardless of (…) administrative or political position' (Lodge and Wegrich 2005:214) and the importance of the 'professional aspect of work within the policy domain' (ibid:223) as important characteristics of Germany's public administration. This shared professional outlook is underpinned by aspects of the recruitment for Germany's public administrations more specifically an emphasis on specialist subject-knowledge, *Fachwissen* (along with legal skills) (Hood and Lodge 2004). Water authorities are mostly interested in water quantities and their management, rather than in the economic factors contributing to the development of flood plains and the increasing exposure to potential flooding. As noted in chapter 2's discussion of hazard and risk it has been argued that specialised scientists such as hydrologists and water engineers

are more likely to use and be interested in the *hazard* of flooding than in the broader risk concept.[86]

Fourth, the choice of HQ100 also reflects the context of the German state's commitment to protect its population from harm, which will be discussed in the next section more extensively. Such a commitment can be made more easily where responsibilities are shared and accountability opaque. This implies that some actors have limited concerns about possible blame assignments (a LANUV expert suggested that 'St Peter is responsible for too much rain' and that such an explanation is accepted by the population (LANUV 2009, interview)); other actors engage in blame games, with the Länder complaining that the 'Federal level ducks its responsibility' (MUNLV 2008, interview) and the Federal level being concerned about making Länder 'take their responsibilities seriously' (BMU 2008, interview).

In what ways does the macro-institutional context of flood risk management in England differ? And to what extent does this institutional variance explain risk-based flood management choices in England's flood regime? And to what extent does this variance explain risk-based flood management choices in England's flood regime? The macro-institutional context relevant to England's flood regime is – contrary to description of England as a 'simple polity' (Schmidt 2005) – also fragmented. However the fragmented responsibilities among state actors are (in the absence of the mutual dependence seen in Germany's 'complex polity') not organised in a manner that fosters the search for consensus or results in the diffusion of responsibility. To quickly recapitulate how fragmentation in England plays out the capability of the water specialist executive and administration is more limited in England as compared to Germany. The central government's

[86] In a discussion with one administrator from NRW's LANUV the author asked the LANUV expert to elaborate on the concept of risk in flood management and how it comes to shape flood management measures. In his response the expert pointed to the most cutting-edge 'risk assessment' project as an example of how risk becomes increasingly important. Intriguingly the project in question was concerned with the probability of dike failure (LANUV 2008, interview) rather than how to develop damage-depth functions for different types of land use. The project has thus been concerned with the cause of harm rather than the wider consequences of the harmful event.

Defra might not have to co-ordinate with lower level government departments as Germany's Federal Environment Ministry needs to with the Länder. But its control over operational and implementation aspects is just as limited due to the fact that the key operational authority (the EA) holds the status of a semi-autonomous, non-departmental public body. However, this can be useful in the aftermath of flood disasters when Defra can shift the blame to the operationally responsible EA. Less appealingly to Defra the department's capacity to determine the course of flood management is also restricted by the strong role of the finance and economics ministry (HM Treasury) in Britain's cabinet in controlling access to financial resources and setting the broad principles of public sector operations (Campbell and Wilson 1995; Chapman 1997; Lee and Woodward 2002). The EA in turn may have seen an increase in power within the flood regime since 1998. However this power can be argued to be effective only for the flood defence domain but still faces barriers when dealing with local planners and their rights to manage their local (planning) affairs. As a result EA and DEFRA – while being formally the lead state actors in charge of flood management – need to find compelling arguments to convince actors without specialist subject-expertise of the need for more funding and tighter regulation to reduce flood risk.

This peculiar form of fragmentation has a number of implications for the form taken by risk-based flood management in England and the role played by the concept and instruments of risk within England's flood regime. First, England's actors use the concept and instruments of risk in flood defence and land-use regulation so as to signal the uncertainty of safety through state interventions. The EA's Flood Maps ignore the effects of flood defences; Defra's Outcome Measures set out risk management goals, not minimal safety standards. This cautious position could be described as a defensive strategy against policy failures and the resulting blame game. The EA in particular is exposed to blame due to its prominent position within the flood regime and its relatively autonomous status.

Second, Defra and the EA use a broader concept of risk to compel local planners and HM Treasury to provide their particular resources, that is planning consent and financial resources respectively. Local planners – who are relatively autonomous and in pursuit of a range of objectives other than flood management in their planning policies – cannot be forced (for example via hierarchy or legislation as seen in Germany) to follow the EA's recommendations on the development of flood risk areas. The use of vulnerability classification and multiple flood zones offer local planners some flexibility and 'objectivity'-based legitimacy when making decisions on local plans and individual development proposals. HM Treasury (traditionally in a powerful position in Britain's executive) requires government departments to prove the relative value-for-money of their use of public money in order to claim a share of the budget. The use of the aggregate benefit-cost threshold and the quantitative NaFRA-based performance targets in Defra's OM often offers compelling arguments for spending on flood defences in particular.

In short the macro-institutional variables associated with the state structure point to some major differences between Germany and England that can explain some of the contrasting choices regarding the use of risk in flood regimes. The type of state structure influences the need for co-ordination between organisations with the same or different organisational and professional outlooks, as well as the opportunities for blame assignment and blame games. Risk can be conceptualised and used in varying ways that serve their different co-ordination and blame management needs.

### 8.3.2 Raison d'etat and political culture of Germany and England

The second variable used to explain variance between the two flood regimes concerns perceptions of statehood, its objectives and responsibilities – and thus the foundations of state legitimacy as they are held by key actors within the flood regimes. This is closely linked to debates about the political culture through which the relations between state and society are defined. Halffman (2005) broadly distinguishes between more interventionist states that define

concrete policy goals and undertake substantial interventions into society to achieve these goals on the one side and those states that act as a referee only to prevent societal excesses on the other. Scholars normally take a long-term view to discern the origins of a particular national political culture – such as Vogel's reference (1986) to Victorian public administration reforms and the backlash to industrialisation in 19th century England leading the business community to defer to Britain's prestigious public service, or Braithwaite's 'frontier state' reference (1997) to explain the antagonistic relations between the business community and the Federal government in the U.S. (Braithwaite 1987:564) to explain the antagonistic relations between the business community and the Federal government. While Vogel and Braithwaite are broadly concerned with regulatory interventions in corporate decisions flood regimes raise questions about the responsibility of state and society in risk management.

Rather than going back to the early history of the German state the most important source of information on the relations between state and society in Germany is the Basic Law of 1949. The Basic Law embodies norms that are not only seen 'as a general framework establishing a minimum consensus about certain principles' but 'as a political programme containing particular substantive goals' (Dyson 1980:213). As noted in chapter 5 this 'political programme' ascribes a significant responsibility to the state for the well-being and protection of the population.

In this context actors are sometimes constrained in their way of conceptualising risk, even as, in other contexts, they see the concept of risk as a suitable instrument for achieving objectives compatible with Germany's notion of the state. First, a minimal standard of safety (mostly HQ100) implies that a particular level of protection is aspired to for almost[87] all individuals. This is compatible with the basic constitutional norms that extend the protection of dignity, life and physical integrity to all individuals

[87] As Saxony's flood defence management in chapter 5 shows, this does not apply for individuals choosing to live in isolated buildings and for many of those living in Dresden.

(Articles 1 and 2, Basic Law). Differentiating safety standards –for example based on the amount of values kept safe – contradicts the idea of a state responsible for the safety of its population. It is for this reason that key actors within Germany's flood regime view a conceptualisation of risk that includes probable damages, which may lead to an asymmetry in the protection of individuals as both politically and juridically problematic.

Second, absolute protection for all is implausible. The Basic Law however does not explicitly define any limitations to the protective duties, i.e. how much risk would be acceptable. Germany's water and environment administrations at state and Federal levels use HQ100 to delineate which adverse events are in the responsibility of the state and which are deemed to be an acceptable risk for the population. Through the HQ100 standard the German state essentially promises to protect individuals against all flood events that occur in their lifetimes (with the Germans' average life expectancy being below 100 years).

Such universal and ambitious safety provision implies great demands on public resources that raise the question of whether the state is actually able to deliver. As noted in chapter 5 flood managers were concerned about the availability of sufficient financial resources for flood defence maintenance, in particular for areas and in times in which no disastrous flood event increases the pressure on politicians to provide funding for flood management.

Third, as HQ100 defines the boundaries to the responsibility of the state for managing flood risks it can be argued that individuals cannot – in a damage-causing event that surpasses HQ100 – expect with certainty to receive compensation. The absence of any regulatory core and specific risk assessment instruments in public disaster financing thus becomes more understandable. The incidences of disaster financing after the Odra and the Elbe floods are therefore puzzling. This 'regime inconsistency' will be discussed below in section 8.4.

Is there a comparable commitment to safety in England? In the absence of a written constitution England's state objectives are much less recognisable and stable. In fact the absence of a constitution is one reason why the executive in England (once elected) faces much fewer veto points than Germany's (Knill 1999). In England, the objectives of the state are therefore more subject to the political preferences and ideas of political parties and individual governments than in Germany.

One influential account of the most recent orientation of Britain's state has been provided by Moran (2003). According to this account the economic and political crises of the 1970s led to a fundamental change in state–society relations and state objectives. Since the 1980s Britain's state has pursued the general goal of 'raising [its] competitiveness against global competition' (ibid:155). This pursuit of competitiveness has, among other issues, led to an emphasis on deregulation and liberalisation of markets and the privatisation of state-owned companies, in particular under the Thatcher government (see also Peck 2001), as well as to the introduction of new public management in the public sector (see also Hood 1991). Another aspect of Moran's account of the regulatory state in Britain is an increasing emphasis on 'standardisation, central control and synoptic legibility to the centre' (Moran 2003:7) in response to the previously prevalent informal patterns of 'club government'. This implied an increased emphasis on transparency and public scrutiny, more formalised, standardised rules and responsibilities and an extensive system of internal audits (Power 1997) and regulation inside government (Hood et al. 1999a).

Risk has been conceptualised and used in a particular way by actors in England's flood regime to facilitate the pursuit of the state objectives and deal with the consequences of greater transparency and scrutiny. First, in terms of the pursuit of economic competitiveness, calculating the potential damage (through NaFRA) and considering degrees of vulnerability of values (the vulnerability classification) allow England's flood defence managers and planners to evaluate different options in terms of economic efficiency

and advantages. Decision-makers are enabled to make more efficient and differentiating use of taxpayer money in flood defence management (the higher the probable damage the better the benefit-cost ratio and reduction of the number of properties at risk as stipulated by Defra's OMs) and more targeted land-use restrictions (the less vulnerable a particular land use the fewer restrictions the developer faces for the economic utilisation of flood risk areas). The macro-institutionally shaped efficiency orientation fell onto fertile ground within the flood management regime since flood management (or as it used to be called land drainage) has been understood as an economic policy field where public investment is supposed to yield economic benefits. Moreover, the reliance on market solutions for disaster financing also seems (at least at first glance) to fit with this efficiency orientation. However the actual organisation of disaster financing – with its HQ75 insurability threshold and a premium-setting that does not fully reflect differences in risk levels – does not fit with economically efficient and liberalised insurance markets. This 'mismatch' with macro-institutional factors will be revisited in section 8.4.

Second, risk instruments can be useful for actors embedded in a context of increased transparency and scrutiny. Flood managers use risk-based Outcome Measures to prove their performance in managing risks to homes without promising safety. This strengthens the defensive position of flood managers if a flood occurs and causes damage, since no safety is being promised. The EA provides local planners with risk-based risk assessments, flood zones and vulnerability classifications. As a consequence the EA can claim to have informed and advised local planners on a flood issue if a flood occurs and damages properties in areas at flood risk. Moreover for local planners the risk instruments, with their scientific 'objectiveness', offer strong justification for their planning decisions vis-à-vis developers. Finally the insurance industry – by making the HQ75 threshold public since 2008 even jointly with the government – seeks to encourage individuals to take a strong interest in finding out about their risk levels and (if at risk from

flooding even for events more frequent than HQ75) whether and what the government wants to do about it. In a context of greater scrutiny and transparency risk instruments can therefore fulfil defensive (blame management) and offensive (increased scrutiny) organisational goals.

In short macro-institutional variables associated with the rationale of statehood and state–society relations sharply differ between Germany and England. The difference between Germany's 'safety-providing' and England's 'competition and transparency' state also influences whether actors use risk instruments to make (risk-)qualified safety promises as shown for Germany or to enable actors to maximise economic benefits and to manage increased accountability pressures on state action as seen in England.

### 8.3.3 Styles of public administration in Germany and England

The third factor concerns the style of public administration. This factor is basically about whether there is a rulebook upon which administrative action is to be based, how formalised and binding this rulebook is, and whether administrators can be held accountable for what is written down in the rulebook. The effects of such rules for state operations have been discussed for public sector reforms (Knill 1999) and environmental policy (Knill and Lenschow 1998; Lees 2007).

Germany's style of public administration can be described as 'juridified' – that is, Germany's rulebook consists mostly of binding public laws. This implies that any administrative intervention of state actors must be based on or connected to a formal law and is subject to judicial review through a specialised court system (*Verwaltungsgerichtsbarkeit*). It is therefore also not surprising that Germany's public administrators not only require subject-expertise (*Fachwissen*) but also legal training (Hood and Lodge 2004). As the discussion in chapter 6 on land-use regulation in particular has shown, actors within Germany's flood regime are sensitive to the possibility of the judicial review of their administrative decisions.

German actors need to reconcile their concepts and calculus of risk with the requirements of Germany's law-based administration. The compatibility of risk-based approaches with the legalistic foundations of public administration is particularly problematic for any conceptualisation of risk that reflects the uncertainty in risk calculations and protection measures. This is because risk calculations serve as a basis for state interventions into property rights (land-use regulations) and for describing how the state ensures the well-being of the population (flood defences). Revealing uncertainty in these calculations may lead to judicial challenges because the state's interventions in property rights may be disproportionately restrictive (e.g. if the protection provided by flood defences is not taken into account in the regulations) or fail to provide the legally sufficient levels of protection. Long-established and clear concepts such as HQ100 (used to distinguish between safety and danger) are acceptable to the legal specialists within public administration and the court system especially – as seen in the case of land-use regulation – when they are linked to existing physical protection through dykes (as noted in chapter 6, one part of the HWSG's definition refers to in front of and behind flood defences). The importance of judicial review for Germany's administrative interventions is not unique to the domain of flood management where (thanks to the relatively recent changes in legislation) courts have yet to be involved in the legal evaluation of flood management measures. Lodge (2001) for instance has detected concerns among state authorities about 'defending legally' specific interventions against 'dangerous dogs'. Rothstein and colleagues (forthcoming) have in general argued that 'courts have found it hard to base their decisions on probabilistic concepts of risk, or to even reach a view on what is meant by concepts of 'risk' and 'acceptable risk'.

England's style of administration can best be described as 'managerial'. There is neither a formal constitution nor a specialised court system examining the legality and constitutionality of administrative operations. Public law – as Hancher and Moran suggest – is concerned with

the ‘pragmatic control of power’ and law is not perceived as the ‘great interpreter of politics’ (1989:156). Halffman notes that:

> “disagreement over specific regulatory decisions is generally expected to be solved in negotiation and, if all else fails, by a process of administrative law in which an appeal is made to a minister rather than a judge” (2005:60).

In this context administrative procedures can be based on varying management approaches. Since the 1980s New Public Management (NPM) has become increasingly important to England’s public administration. NPM is normally associated with greater managerial scope and ‘performance accountability’ (Light 1993).

England’s flood managers therefore do not face the same judicial constraints. One illustrative example is land-use regulation. The EA could be interpreted as a specialist overseer. However its supervisory powers are limited to being a ‘statutory consultee’ that reports about whether its advice has been accepted to Parliament. Planners are also subject to appeals processes that involve the generalist inspectors from the Planning Inspectorate (PINS). However these lay inspectors flexibly balance the arguments of the different involved parties in the appeals process (see chapter 6). Even where disagreements persist the case will be taken forward to the Secretary of the State from the DCLG. Only when all these administrative steps are exhausted may the High Courts of Justice get involved. Moreover the review of administrative action is – in a culture of NPM and target-setting – usually undertaken against quantitative performance targets and economic evaluation. As noted earlier conceptualisations of risk that include monetary and other quantitative measures of damage potential help meeting such review demands.

In short a review of the styles of public administration contrasts Germany’s ‘juridified’ style with the ‘managerial’ style found in England. The ‘juridified’ style in general struggles with probabilistic concepts as a basis for intervening into property right and defining ‘acceptable risk’ levels.

If risk terms are to be accepted they need to be clear and well-established in theory and practice, as is the case within flood management for HQ100. In contrast a wide conceptualisation of risk facilitates the quantitative standard-setting required in England's 'managerialism' and is acceptable in the appeals and review processes predominantly set outside the court system.

### 8.3.4 National styles of risk governance and macro-institutional context

Macro-institutional characteristics of the state and state–society relations such as a particular state structure, different objectives of statehood and specific administration styles in Germany and England clearly limit and shape the choices of actors within the two countries' flood regimes. The macro-institutional characteristics of Germany and England differ and actors in the two countries choose a particular use of the concept and instruments of risk that is compatible with these macro-institutional variables.

In Germany the macro-institutional context provides incentives to state actors to make use of risk as a co-ordination and harmonisation device within the fragmented Federal state structure in a manner that is reconcilable with the legalistic requirements of Germany's *Rechtsstaat* and enables the state to provide protection to an equal level to most of its population (protective state). As a result state operations within Germany's flood regime are in general geared towards the scientific and in flood management long-established probabilistically defined minimal safety standard of HQ100. By using this standard as a default the state sets risk-based boundaries to its constitutional responsibility for providing safety to its population. Alternatively where the concept of HQ100 is not central – especially in 'effecting' that requires public financial resources – political negotiations between Germany's multiple government levels are one determinant of the nature of flood management measures.

In England by contrast the macro-institutional context encourages state actors to utilise risk instruments as a means to legitimise trade-offs between harm prevention and cost in ways that limit their own liabilities. In

other words risk is used as a way of defining acceptable adverse outcomes in the context of the state's desire to perform state operations with economic effectiveness and increased accountability pressures. The risk instruments in use therefore take into account the damage potential (allowing for an economic evaluation of state operations and targeted interventions into socio-economic processes) while at the same time communicating the uncertainty of protection to the population and ensuring a defensible consistency of state interventions through centralised risk assessment.

## 8.4 EXAMINING INTERNAL REGIME CONSISTENCY

At first glance these macro-institutional accounts of risk-based flood regimes describe relatively consistent arrangements. In Germany there is the HQ100 reference value that lends coherence to flood defence management and land-use regulation across Länder boundaries. In England's flood regime there is one single, central actor (the EA) which holds the expertise and is in charge of producing most of the risk instruments – along with technical guidance for other actors involved in England's flood regime.

The following two sections however will point to some contradictions within the two regimes. Some of these contradictions are connected to interdependencies between different regime domains that raise questions as to whether Germany's protective state is really limited to HQ100 events and whether the English flood managers' ability not to promise safety is not possible mostly due to the peculiar disaster financing arrangement. Other contradictions concern the regime functions that may also constitute challenges to the overall objectives of each of the two regimes.

### 8.4.1 Contradictions across regime domains

This section focuses on the organisation of particular regime domains that contradict the types of risk-based regimes that have been identified in the

discussions of the macro-institutional variables.[88] There are two noteworthy contradictions, each of which is linked to the disaster financing domain.

HQ100 is used to define the end of the German state's involvement in flood management. Beyond that state actors encourage precautionary behaviour including the purchase of private insurance. The absence of any formal commitment by the state to financially support victims of floods with a lower probability than HQ100 is therefore not surprising from a macro-institutional perspective. This also explains why the German state did not provide any significant funds to victims in the aftermath of the Rhine floods of 1993 and 1995. However this is not the whole story since the state has provided *ad hoc* disaster financing for the Elbe and Odra flood events. This seems to match more closely the German welfare state's norm of solidarity. As these are inconsistent outcomes linked to different macro-institutional variables (the qualified protective state versus the welfare state) a simple focus on the macro-institutional context cannot explain why Germany's state only provided significant disaster compensation after the Odra and the Elbe floods, but not after the Rhine floods of 1993 and 1995. Rather as shown in chapter 7 it is essential to take into account factors such as elections and the particular needs of the poorer Eastern German regions.

Rather than being safety-oriented, England's flood regime has been characterised as oriented towards efficient economic performance. The private insurance-based approach to disaster financing fits neatly with this orientation, especially given an assumed superiority of market mechanisms in delivering efficient outcomes. However the actual practices on the insurance market conflict with the idea of economically efficient outcomes. Insurers fail to price flood cover adequately in view of public and political

[88] There are further technical inconsistencies in the use of risk instruments between domains. For instance, the Environment Agency's NaFRA uses HQ75 to delineate high-risk categories. When determining flood zones in its Flood Map the EA uses HQ100 as boundaries of high-risk zones. These are outcomes of different political and institutional dynamics: HQ75 is a compromise between insurers and government; HQ100 has been used in land-use regulation for almost 20 years and has therefore also served as the basis for the more recent mapping by the EA.

expectations and the regulation of supply through the Statement of Principles. Even though insurers have been trying to prevent growth in exposure at least the insurance market provides a *de facto* financial *safety* net to the population. This may be argued to allow the government to limit its involvement in flood management as arguments about the moral hazard of Britain's government in flood management (Huber 2004) suggest. The *current* macro-institutional context is therefore insufficient to understand some influential aspects of England's flood regime. Rather it is important to take a look at the *historical* evolution of flood insurance markets – in particular at the gentlemen's agreement from 1961 that continues to shape current decision-making by the insurance industry and the government.

### 8.4.2 Contradictions across regime functions

This section focuses on contradictions between the regime functions of detecting, directing and effecting.

HQ100 is the key risk category in the German state's directing. HQ100 (as noted in section 7.2) is a probability-centric conceptualisation of risk that ignores the material consequences of flood hazards. This 'smaller' concept of risk in directing contradicts the more advanced efforts in detecting – such as Saxony's 'flood protection concepts' or the ICPR's 'Rhine-Atlas' – that include the 'bigger' concept of risk with calculation of damage potential. While macro-institutional variables shed light on why actors use the 'smaller' concept in directing, the use of the 'bigger' risk in detecting can partly be explained by the interests and interactions within the expert community of flood managers and risk analysts. For instance the motivation of Saxony's flood managers to develop very elaborate protection concepts cannot be understood without taking into account the presence of the Swiss experts' resources and solutions. The expert working groups of the ICPR decided to produce a damage potential assessment for the 'Rhine-Atlas' partly to communicate to policy-makers the huge risks of flooding along the Rhine, thus putting flooding onto the political (and budgetary) agenda.

In England this contradiction between the state's directing and detecting is not present since directing also uses the 'bigger' concept of risk. This is different though for the activities of private insurers in disaster financing, in particular the probabilistic HQ75. As argued in chapter 7, that threshold needs to be seen as an exposure-reducing response in the context of the gentlemen's agreement.

A widely discussed contradiction between different regime functions is that between directing and effecting. This contradiction is present in both countries, though in different domains. German actors set ambitious safety goals defined in risk terms (HQ100). However to achieve the desired safety levels through public spending financial resources must be made available. The availability of such capital, however, is not driven solely by the particular risk-based safety goals but is also shaped by the occurrence of disasters and (as noted in chapter 7) political negotiations within Germany's multi-level government. In England there are also gaps between directing and effecting – most notably in land-use regulation – as the discussion in chapter 5 has highlighted. The particular institutional fragmentation between EA and autonomous planners helps explain this implementation deficit.

These contradictions within flood regimes between individual domains and functions cast doubts upon the rationalising forces of risk and the extent to which a particular macro-institutional context results in consistent risk-based flood management. Even when the macro-institutional context compels actors to use the concept and instruments of risk for a particular end the emerging risk-based regimes are prone to contradictory arrangements. Germany's 'protective state with HQ100-limited liability' may fall short of protecting its population to the HQ100 since the funding required for the desired protection may (for political and institutional reasons) not be made available as needed. At the same time the government sometimes assumes financial liabilities in disaster financing for events beyond its HQ100 limit. This points to a certain 'fuzziness' of the HQ100 boundaries of Germany's flood regime. England's 'competitive and

transparent state' is not as consistently oriented towards economic efficiency as a pure review of the state's operations may suggest. This is because the disaster financing domain contains a privatised financial safety net provided by commercial insurers.

## 8.5 Conclusions

This chapter took on two sets of arguments. The first set proposed cross-country convergence in risk-based management. In contrast to the partial analyses in chapters 5 to 7 this chapter takes a holistic view and challenges functionalist and institutionalist isomorphism arguments about international convergence. From a functionalist perspective there has been a shift towards more anticipatory (rather than remedial) as well as 'green' and social (rather than technical) approaches to flood management for which risk-based flood management can be expected to be instrumental. From a neo-institutionalist perspective there are transnational expert networks, widely adopted flood management templates and supranational policy initiatives that can be expected to result in the adoption of risk-based flood management.

This set of arguments cannot explain the distinct conceptualisation of risk in the flood regimes of Germany and England as well as varying degrees to which risk informs the flood regimes in the two countries. This chapter argued that the emerging nationally distinctive patterns of risk-based flood management can be linked to three macro-institutional sets of factors, namely the structure and rationale of the state as well as the style of public administration. Leaning on the literature of 'national styles of regulations', the second set of arguments therefore examined how macro-institutional factors explain two different patterns in which the concept and instruments of risk are conceptualised and used in these flood regimes.

The two types of risk-based flood regimes identified, namely Germany 'providing safety' regime and England's 'managing uncertainty' one, seem to vindicate the macro-institutional approach to explaining the diversity of risk-based flood management. However there are contradictions

within each regime. These point to the role of politics following disasters, the importance of the legacy of former institutional arrangements and the conflicting outcomes from different macro-institutional determinants.

# CHAPTER 9: CONCLUSIONS. PUTTING RISK-BASED GOVERNANCE INTO INSTITUTIONAL CONTEXT

This study is about diversity in risk-based governance. Using a cross-country comparative perspective, it has pursued three aims: first, to challenge arguments about a convergence towards a particular form of risk-based governance; second, to describe and analyse diversity in risk-based governance; and, third, to identify and explain observed patterns of variance in the case studies by putting risk-based governance into its institutional context.

These aims were pursued through the empirical examination of the flood management regimes in Germany and England. Studying flood management has been particularly relevant for the study of diversity in risk-based governance because actors in both countries are traditionally familiar with, and have access to, advanced risk assessment instruments. The choice and design of risk instruments is therefore not limited by availability or actors' ignorance of them. Germany and England are ideal candidates for a comparison because they are exposed to similar pressures for convergence towards risk-based governance while displaying significant variance in their institutional contexts. Using the meso-level risk regulation regime perspective has allowed for a nuanced analysis of the diversity of (and the varying drivers of) the emerging forms of risk-based flood management. Thanks to the disaggregation into regime domains and functions achieved here, internal contradictions within each of the regimes became visible, the varying ways in which institutions shape individual aspects of the regime could be discerned, and convergence arguments could be tested for domains in which they would be expected to be most applicable.

The findings of this study, presented in the next section 9.1, have implications for arguments of convergence and those scholarly contributions that have emphasised diversity in the governance of risk. These implications will be discussed in sections 9.2 and 9.3. These are followed by a section on the limitations of this analysis and opportunities to expand on this research.

## 9.1 NATIONAL PATTERNS AND INSTITUTIONAL DRIVERS

There are two key findings of this dissertation. First, there is no single form of risk-based flood management adopted in Germany and England. Secondly, the institutional context can – to a large extent – explain the national patterns found in the use of concepts and instruments of risk in the two countries' flood regimes.

The first finding directs our attention to the different forms of risk-based flood management. In Germany, risk underpins an emphasis on the state-provided provision of safety to the population, for instance, through the setting of safety standards in flood defences and by distinguishing between safe and dangerous areas in planning. To this end, Germany's public flood managers use 'hazard' assessments and 'hazard'-based management instruments, for instance the HQ100 reference standard. These 'hazard' instruments, however, do not exclusively shape Germany flood management, especially where public spending for flood management is concerned. In contrast, England's state actors use of risk instruments serves to highlight the uncertainty of the protection provided by state as reflected in the absence of any safety standards and flood mapping that discounts the protective effects of flood defences. They also typically take into account the 'risk' of flooding in the broader sense of probability *and* consequences, for instance through NaFRA's benefit-cost calculations and PPS25's vulnerability classification. While public measures draw on available risk calculations, England's private insurance industry does not make full use of the assessments in its underwriting.

These distinctive patterns and underlying choices are strongly determined by the particular constraints and opportunities actors face, which are in turn shaped by the institutional context. As shown in chapter 3 theoretically and chapters 5–7 empirically, the concept of institutions includes a wide range of variables – from structural to cultural, from normative to procedural. Specifically, the risk-based flood management in

Germany and England is shaped by the three macro-institutional factors: first, the fragmentation and coherence in government and public administration structures; second, the perceptions and norms that reflect and describe the state's objectives and state-society relations; and, third, the prevalent styles of public administration.

Germany's emphasis on 'providing safety' reflects perceptions and norms that define the state's responsibility and unique capacities to protect the population from mishaps. These perceptions and norms are found in Germany's constitution and flood legislation; they reflect the state tradition and philosophy of the 19th century that continues to shape Germany's concept of statehood, and are endorsed among flood managers and experts as well as the judiciary. The choice of the specific HQ standards is, however, not only shaped by Germany's 'protective' state but also by other particular constraints actors face in Germany's complex polity. Most notably, Germany's state is characterised as a *Rechtsstaat* (the legalistic and constitutionally-shaped nature of Germany's state and its operations) and *Bundesstaat* (the Federal structure of Germany). The *Rechtsstaat* implies that risk-based interventions can be subject to judicial review. As a result, they have to rest on well-established, technical concepts, such as HQ100, and be proportionate (for instance, interventions in the name of safety must show that they are essential for the population's well-being to justify any restrictions on the constitutionally guaranteed property rights). The *Bundesstaat* endows the Länder level with veto rights on Federal water legislation, restricting the Federal government's ability to harmonise flood management beyond setting a standard widely used across the German Länder. Another factor that explains the choice of HQ standards is that flood management primarily based on hazard assessment fits well with the dominance of water specialist authorities across the domains of Germany's flood regime (reflected, for instance, in the lead role of environment ministries and the veto rights of water authorities in flood-related planning legislation and decision-making). Traditionally, these specialist authorities

focus on calculating water quantities and their distribution over land rather than considering the potential damage that floods may cause.

Macro-institutional variables not only shape the conceptualisation of risk in Germany's flood regime. They can also – at least partially – explain why risk fails to make an impression on the area of public spending in the flood regime. For instance, political proportionality – as reflected in the population-based *Königsberger Schlüssel* used for the financing vehicle GAK – outweighs risk as an allocational principle as a result of the political negotiations between Länder and Federal level within Germany's complex polity.

How does England's macro-institutional context differ when explaining its contrasting risk-based flood management approach? The particular form of England's 'managing uncertainty' flood regime is connected to the particular exposure of its key actors to public scrutiny and blame. This is a result of the concentration of responsibility, and in particular the high public profile of the Environment Agency within England's flood regime. This reflects, on the one hand, arguments about blame avoidance through 'agency strategies' (Hood 2002), specifically through delegating responsibility for flood management from Defra to the EA. On the other hand, scrutiny and blame are intensified because of the elevated role of public discourse and confrontation in centralised, 'simple polities' such as Britain's with their 'winner takes it all' majoritarian election systems (Schmidt 2005). This contrasts with the aforementioned complex Federal state of Germany in which political conflicts are resolved through negotiations among different parts of the state and key stakeholders in a consensus-seeking political culture.

A second major influence on England's flood regime are the ideas and procedures that stress the performance and efficiency of state operations, including New Public Management (NPM) and a performance 'target culture' (Bevan and Hood 2006). These ideas can be linked to Thatcher's adoption of 'neoliberal' ideas that rose as a result of the alleged economic

failures of the post-war Keynesian interventionist state in the 1970s. Moreover, these economic performance ideas are in turn underpinned by the central role of the economic and finance ministry in England's executive. This central role goes beyond budget and macro-economic policies, and includes guidance for public sector management (such as the introduction of public sector agreements) that shapes the operations of specialist departments and agencies. Part of this Treasury-generated guidance has also included the endorsement of a risk-based approach to regulation (Hampton 2005).

This is not to say that macro-institutional factors determine all aspects of the emerging risk-based flood regimes of the two countries. As chapter 8 has argued, there are aspects in both regimes where additional factors have to be considered. One such set of factors are the historical, institutional legacies that are specific to the flood regime of each country. They can underpin some characteristics of the regime (for instance, a long tradition of benefit-cost calculations in the country's flood defence domain creates a conducive environment for expanding on the use of risk-based economic instruments) and explain some of the contradictory arrangements in flood regimes (for example, the gentlemen's agreement between England's government and insurance industry explains the 'social' function that the insurance market assumes in disaster financing). Another group of factors are the political dynamics, most notably the imminent Federal election of 2002 that turned comprehensive disaster aid to victims into a politically appealing choice. However, the national patterns in risk-based flood management are very distinctive for Germany and England's flood regimes, and various institutional constraints and opportunities have been shown to be of great important in shaping these particular national patterns.

What are the implications of these national patterns of risk-based flood management for the arguments of convergence and the analysis of diversity in risk-based governance?

## 9.2 REVISITING CONVERGENCE ARGUMENTS

The dissertation identified four arguments in support of an international convergence towards a particular form of risk-based governance. The first argument for convergence (discussed directly in chapter 5-7) is that a particular form of risk-based governance can improve the effectiveness of the state or help replace the state with more effective market-based governance mechanisms. This argument is inspired by neoliberal critiques of the state and advocacy of markets (Peck and Tickell 2002; Peck 2001; Castree 2008a; 2008b). Risk offers a solution because risk instruments can convert policy issues and responses into quantitative, comparable, ideally monetary numbers that make explicit probable damages from certain events and the effects of flood management interventions. This allows states to pick the most economically efficient interventions (maximising the 'value-for-public money' in flood defence spending and ensuring more targeted 'better regulation' in land-use regulation) and the markets to price their governance 'services' (adequately pricing the risk transfer from individual to insurer in the form of premiums).

The 'economic effectiveness' driver has been found to be only partially valid in explaining the emerging risk-based flood management regimes in Germany and England. More specifically, 'economic effectiveness' is one important motivation for adopting risk-based governance in the particular institutional settings of England.

In Germany, risk instruments are fragmented and focus on hazards, preventing national level comparisons of the economic effectiveness and consequences of interventions. This has been linked to particular structural factors, namely the *Bundesstaat* structure (that prevents the emergence of consistent, comparable risk assessments across Germany) and the dominance of water and environment authorities in Germany's flood regime (whose shared professional outlook is focused on the hazard rather than the risk of flooding). In addition, there are more generic barriers to the

'neoliberalisation' of Germany's flood regime that also affect the use of risk in governance. Most importantly, cultural and normative factors form significant barriers to this 'economic effectiveness' orientation. These factors stress the provision of safety to the population and the equal treatment of citizens. Moreover, the complex Federal state structure also highlights the need for negotiations and political proportionality that contradict a purely economic rationality. This suggests that under the particular German institutional context, a 'neoliberalisation' of risk governance faces substantial barriers of mostly cultural and normative (as well as structural) kinds.

In contrast, many risk instruments in England take the forms desired by those stressing the need to improve the state's economic effectiveness. Risk instruments such as NaFRA and the EFO flood map provided by central government organisations consider the probable damage of future flood events based on a nationally consistent and thus comparable assessment. Moreover, there are procedural (NPM and the target culture in the public administration), normative (the rise of neoliberal ideas) and structural (the strong role of HM Treasury) variables that promote an economic effectiveness orientation in flood management. However, even for England's case, this argument only offers a partial explanation: flood insurers do not use risk instruments and the markets do not regulate behaviour as might expected by neoliberals. Moreover, the discussions show how key actors in England's flood regime are strongly concerned about attracting blame for the failure to protect, and that this has also been driving the use of risk in flood management.

This latter aspect redirects attention to the second convergence argument, interpreting risk-based governance as a response to heightened demands for transparency and accountability on state actors. These heightened demands reflect universal societal changes towards 'late modernity' (Giddens 1991) and an emerging international institutionalisation of an accountability and transparency culture (Rothstein et al. forthcoming).

Risk offers a solution to accommodate these demands for two reasons. First, risk instruments can make (quantitatively) transparent both what state actors deem an acceptable risk and how successfully the state manages unacceptable risk. Secondly, risk instruments, calculating and managing on the basis of probabilities (as opposed to certainties) can highlight the uncertainties associated with the state's risk management (Rothstein et al. 2006), as well as justify interventions on the basis of the scientific 'objectivity' and of the proceduralisation of risk management (Porter 1995; Power 2004).

England's public flood managers use risk instruments to emphasise the uncertainty of protection and introducing 'objective', risk-based procedures into flood management with which to justify policy failures and controversial policy choices. This reflects the intensified accountability pressures on England's flood managers that are in turn a result of the particular state structure.

In Germany, however, ambitious safety goals mean that flood managers are not especially sensitive to a public backlash in the aftermath of flooding, reflecting the difficulties in attributing responsibility for flood management in Germany's complex, multi-level system of governance. However, one traditional accountability mechanism has a significant impact on Germany's flood managers, namely the mechanism of judicial review of administrative interventions and processes in Germany's *Rechtsstaat*. Judicial review has a different impact on risk-based governance in Germany than in England. In Germany, the prospect of the judicial review (and potential annulment of administrative decisions) compels actors to use risk in a manner that reduces uncertainty as much as possible – for instance by choosing the well-established risk category of HQ100. Arguments that use accountability pressures as a cause for convergence in risk-based governance therefore need to be treated with caution, since accountability pressures can take distinct forms as shaped by the particular institutional context in which

actors are held to account, and this can lead to different forms of risk-based responses.

The third argument explains convergence by pointing to the functional rationality of risk in emerging flood management approaches that increasingly anticipate and stress the adaptation of wider socio-economic processes to nature. This new emphasis implies that better risk information on future flooding is required not only to design flood defences but also to steer human behaviour.

Even if actors choose not to act in a functionally rational manner, another argument that predicts convergence in risk-based flood management highlights the institutional mechanisms through which risk-based flood management can be expected to be widely diffused internationally. Following neo-institutionalist arguments about isomorphism, it can be expected that risk-based flood management is diffused internationally through various institutional mechanisms, from transnational expert networks to imitation of flood management programmes to supranational regulations. While the third and fourth arguments do not point to any specific form of risk-based flood management, they raise our expectations that risk-based flood management in different countries should be similar. However, as the discussion of the national patterns argument in the previous section showed, risk-based flood management in Germany and England is not similar.

As compelling as the convergence arguments may have appeared, the cross-country comparison of Germany and England's flood regimes has shown that risk-based governance can come in different forms in the issue area of flood management, and that pressures for convergence can be filtered and blocked by institutional factors.

## 9.3 ENRICHING THE DIVERSITY DEBATE

The diversity of risk in governance has been recognised in scholarly discussions, as chapter 3 highlights. This study of diversity in risk-based flood management reinforces and expands on these accounts.

First, some of the diversity literature concentrates on only one set of institutional variables. One prominent example is cultural theory (Douglas and Wildavsky 1982). According to this approach, choices of regulatory regimes and policy instruments can be linked to particular (dominant) understandings and perceptions of the nature of the world and cause–effect relations (Lodge et al. 2008). The discussion of flood management regimes suggests that some aspects of the emerging regimes can be associated with particular worldviews, but not all.

Germany's safety orientation, for instance, can be argued to reflect a hierarchist–egalitarian hybrid worldview, given the efforts to ensure control up to a particular level (hierarchy) and the dominance of water authorities (egalitarianism in the form of decision-making shaped by a professional community). However, it is equally important to consider those structural characteristics of Germany's institutional context (that is, the fragmentation in the Federal state) that cannot be easily linked to the hierarchy-cum-egalitarian worldview prevailing in Germany's public administration but have significant impact on risk-based flood management.

England's case also offers some additional insights. In terms of worldviews, individualism seems to prevail within England's regime. Choice as a means of control could be argued to be reflected in the individual responsibility for picking insurance cover in disaster financing, but also in the transparent communication of risk and uncertainty (through publishing Flood Maps on the Internet and providing risk advice to local planners). This allows actors to make choices about how much risk they are willing to accept. However, the individualist worldview normally associated with markets has to be revised for the particular flood insurance market in

England, where choice is restrained (flood cover is part of the package required for mortgage lending) and everyone participates in the responsibility for risk in a similar way (thanks to limited price differentiation and significant size of risk pool). This underpins arguments about the parallel (and competing) existence of worldviews in one regime (here, individualist and egalitarian), and points to the need for studying historical institutional legacies that may have been formed at a time when different worldviews prevailed.

Second, some of the diversity literature focuses primarily on particular government tools and actors. One example is the national styles of regulation literature. Vogel (1986), for instance, focuses on environmental and consumer protection regulation by the governments in the United States and Europe. This dissertation not only looks into land-use regulation but also examines the macro-institutional determinants of public infrastructure spending (the government tool of 'treasure') and the government–insurance industry dynamics that shape disaster financing markets and practices (non-state governance). As chapter 8 showed, the dynamics in a domain such as disaster financing are different from the ones in land-use regulation. For instance, England's actors in other domains have been found to be attributing a special weight to the economics of flood management and the fear of blame attribution. In disaster financing, insurers assume a quasi-social function (rather than one which stresses economic efficiency) and attempt to strengthen accountability pressures on government. Moreover, the marginalisation of risk in Germany's risk-based flood management regimes where public spending is required (that is, for flood defences and post-disaster aid) also points to dynamics specific to the government's tool of treasure, shaped by the specific distributional conflicts within the Federal state. These dynamics within flood regimes would not be captured if the analysis had focused on regulation only.

Third, some of the literature on risk regulation regimes has focused on diversity between different risk issues within a single country, most

notably Hood and colleagues (2004). By undertaking a cross-country comparison of risk governance regimes, this dissertation sheds light on the impact of institutional variance on risk-based governance, complementing the traditional interest group and public opinion analysis used for the analysis of risk governance.

### 9.4 POLICY IMPLICATIONS

This section briefly discusses two reasons why cross-national diversity in risk-based flood management has important implications. The first reason is that it is likely to affect international policy integration – more specifically, the implementation of the EU Floods Directive. The implementation of the Directive is still at its early stages, with all member states having transposed the Directive into national law and named competent authorities.[89] The next step is the generation of preliminary flood risk assessments due to be finalised by the end of 2011, followed by flood maps and flood risk management plans by the end of 2013 and 2015 respectively. To some extent, the Directive ensures that national autonomy in flood management is safeguarded. Paragraph 10 recognises that the objectives of flood management should be determined nationally. Paragraph 16 stresses that existing national assessment instruments can also fulfil the requirement for developing the various risk assessments instruments required by the Floods Directive. At the same time, however, member states are obliged to produce assessments and maps of flood hazards and *risks* (including number of inhabitants affected and the type of economic activity) for three probability categories (Article 6), as well as flood-risk management plans that include relevant information on the costs and benefits of management measures (Article 7(3)). As other research on the implementation record of the EU directive shows, the record and the actual form of implementation is often shaped by the 'logic of appropriateness' (March and Olson 2004). Knill and Lenschow (1998) compare the implementation of four EU directives in

[89] According to the Floods Directive Scoreboard on the DG ENV website (see http://ec.europa.eu/environment/water/flood_risk/timetable.htm, accessed on 28.08.2011)

Germany and Britain and argue that the EU-required administrative adaptation depends on the extent to which a change of the core of national administrative institutions was required. Cost-benefit considerations, as well as a greater focus on the material consequences of floods, for instance, can be argued to require a deeper adaptation from Germany's actors than from England's.

While many of the practical deadlines for the implementation of the Flood Directive are still a few years away, the very recent revision of the WHG (that became effective as of August 2010) suggests that the risk-based flood management in Germany will not be amended substantially as a result of the transposition of the Flood Directive: While the risk assessment may become more systematic in particular by compelling Länder to undertake damage potential assessments (WHG §74.4), the practices of risk-based flood management remain unchanged in other respects. Most notably, the legal category of 'flood-prone areas' was abolished, leaving 'inundation areas' as exclusive regulatory category for local planners and water authorities within Germany's flood regime (WHG §76).

The second reason is that rivers can transcend national boundaries. Flooding is – potentially – a transboundary risk. Diversity in national risk assessment and management systems can impede the co-ordination of flood management along river catchments. While there are transnational river management bodies, methods for risk assessment vary across countries. For instance, the Dutch HQ1250 flood defence standard and NRW's HQ500 protection level at the Rhine's Lobig gauge do not result in dykes of different height (MUNLV 2008, interview). This is because Germany's dykes normally include a so-called *Freibord* (distance between top of the dyke and the design standard). Different methods of calculating HQ100 for the Odra in Poland and Germany have led to different actual protection levels (SMUL 2008, interview). An interesting, hypothetical question would be whether a transnational river catchment (such as the Rhine river's) could be managed if an upstream nation would apply a benefit–cost ratio at a

national level. Investing into flood protection may just not make sense right in front of the national borders. One solution might be that the downstream country would pay for upstream management measures, as happened, for instance, by agreement between Germany and France in 1982 for the Upper Rhine (Germany paid for the construction of a retention basin in France).

## 9.5 LIMITATIONS AND AVENUES FOR FURTHER RESEARCH

This section focuses on the limitations of this dissertation and suggests directions for future research thereof.

One important question concerns the generalisibility of the argument about national approaches to risk-based governance and their macro-institutional determinants. This thesis focused on exploring what diversity in risk-based governance may look like (hence, the focus on a traditional type of risk of flooding in which risk instruments have been well-established) and how institutions have shaped this diversity. But is the management of other types of risk in Germany and England organised along the same lines? The study of Hood and colleagues (2004) highlights the diversity of the governance of different risk regimes in Britain. This casts doubts upon the idea of consistent national styles of flood management and risk-based governance, and thus would restrict the validity of the national patterns argument in the particular case of flooding. However, the effects of the discussed institutional variables on the use of risk instruments can also be found for other risk types. One example is the recent food safety crisis around the EHEC bacterium in Germany that demonstrated the impact of the structure of Germany's Federal state on risk assessment instruments. In particular, the often contradictory expert assessments by Landes health authorities (such as Hamburg's), the Robert-Koch-Institute (the research institute associated with the Federal Ministry of Health) and the Federal Institute for Risk Assessment (the Federal agency associated with the Federal Ministry for Agriculture, food and consumer protection) were seen as characteristic of Germany's risk governance. There are further examples (such as the failure to hold any actor responsible for the mass panic at the

Duisburg love parade[90]) in Germany's complex, multi-level governance arrangements. Another example is the threat of energy companies to sue the government at the Constitutional Court on the basis of an infringement of property rights for its decision to phase-out nuclear power by 2022 (that followed a reassessment of risks in the aftermath of Japan's Fukushima nuclear accident in March 2011)[91]. Given the arguments about diversity within one country and the examples underlining the impact of the institutional variables even beyond flooding, it would be important to examine whether the identified national patterns also hold for other types of risk.

Another question is whether the effects of institutional variables and the incidence of national patterns of risk-based governance can also be found in other countries. France, for instance, combines a number of features of both countries. On the one hand France's state continues to be strongly centralised and features semi-autonomous agencies in the fields of food, pharmaceuticals, occupational safety, environment and disease control (Borraz 2008). On the other hand, there is the portrayal of the state as providing security, being in control and pursuing the general interest. Tentatively exploring the notion of particular 'national personality' types of the risk-managing state, Rothstein and colleagues (forthcoming) argue that France's institutional features ultimately result in an approach to risk-based governance that stresses secrecy, reactive crisis management and the identification of individual public officials as culprits for policy failures. How can this notion of a personality be squared with the internal inconsistencies found for flood management regimes? Additional cross-country comparative studies are needed to establish the extent to which

[90] See article '*Das Schuldpuzzle von Duisburg*' (the 'guilt jigsaw of Duisburg'), DIE ZEIT online, 21/06/2011, accessed on 29/8/2011 under http://www.zeit.de/gesellschaft/zeitgeschehen/2011-06/duisburg-love-parade-schuld/komplettansicht.

[91] See article '*Versorger planen Verfassungsklage*' (the 'utilities plan constitutional complaint', FAZ online, 29/08/2011, accessed on 29/8/2011 under http://www.faz.net/artikel/C32436/atomausstieg-versorger-planen-verfassungsklage-30443408.html.

macro-institutional variables uniquely determine the emerging risk-based governance regimes and to what extent they produce ambivalent outcomes in terms of risk-based governance.

Finally, there is a set of limitations related to choices of time period and subnational case studies. For instance, Saxony and NRW were chosen because of their pioneering role in Germany's overall flood management regime, providing particularly conducive testing grounds for the use of advanced risk instruments. It would be interesting to investigate whether there is also systematic diversity between other Länder and what kind of barriers (beyond the absence of devastating flood events and resources) risk-based flood management may have faced in other Länder. Moreover, the cut-off date of 2005 in Germany also excluded more recent, potentially relevant changes to Germany's Federalist system. In September 2006, the Federalism Reform I (*Föderalismusreform* I) came into effect. In terms of environmental legislation, the framework competency of Federal legislation was replaced by permission for the Länder to deviate (in specified areas) from the Federal Law through the development of competing legislation. This may imply greater diversity in risk-based flood management within the German case study, potentially making it more difficult to identify a particular national pattern of risk-based governance. For England, the Conservative Big Society idea (with its associated decentralisation of governance) might reverse the centralising tendency in the flood management regime and change its accountability dynamics. How do these new pressures and changes affect the institutional context in which flood managers operate?

### 9.6 SOME FINAL THOUGHTS

Flood managers have moved a far way from perceiving floods as 'Acts of God'. In part driven by the long absence of major floods in countries such as England and Germany, flood managers and the public assumed that technical control over natural processes had become possible. The 1990s and 2000s, however, demolished this assumption.

The policy response has two sides. On the one hand, risk instruments are introduced because better anticipation of disasters is instrumental for adaptation and preparation, increasing a country's resilience against flood disasters. On the other hand, risk instruments deal with retaining the state's legitimacy. This legitimacy is at risk for two reasons. First, the state's resources are finite – and this becomes particularly conspicuous in times of austerity. Second, the population in advanced European countries expects a high level of safety. This expectation is combined with increasing levels of public scrutiny of the state's interventions.

This raises the need for risk managers to communicate the limits of governance. Both German and English flood managers engage in this communication, but with different outcomes that result from different institutions. What are the implications of such a limited role for the state in its risk management on the society? Where are the boundaries between the state and society in the risk society? Who takes the place of the state? Insurers? The Big Society? The individual citizen?

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## APPENDIX: LIST OF INTERVIEWS

| # | Reference | Date | Organisation | Position |
|---|---|---|---|---|
| **Germany**[92] | | | | |
| **1** | GDV 2008a | 28/4/08 | Association of German Insurers | ZÜRS team leader |
| **2** | GDV 2008b | 28/4/08 | Association of German Insurers | Department of Non-Life Insurance; Statistics team |
| **3** | GDV 2008c | 28/4/08 | Association of German Insurers | Department of Non-Life Insurance; Head |
| **4** | UBA 2009 | 30/4/08 | Federal Environment Agency | Department of Water and Soil; Flood management officer |
| **5** | LTV 2008 | 06/5/08 | State Reservoir Administration of Saxony | Technical Department-Water Engineering; Head |
| **6** | LFUG 2008 | 08/5/08 | Environment Agency Saxony | Flood Management Centre; Head of Hydrology Unit |
| **7** | Environment Authority Dresden 2008 | 08/5/08 | Environment Authority Dresden | Head of Flood Management Department |
| **8** | BMF 2008 | 13/5/08 | Federal Ministry of Finance | Head of General Financial Administration |
| **9** | SMUL 2008 | 15/5/08 | State Ministry for the Environment in Saxony | Head of Unit Flood Management |
| **10** | ICPR 2008 | 16/5/08 | International Commission for the Protection of the Rhine | Vice-President |

[92] All interviews with German experts were undertaken in German. I undertook the translation from German into English myself.

| # | Reference | Date | Organisation | Position |
|---|---|---|---|---|
| **Germany (continued)** | | | | |
| **11** | BMU 2008a | 20/5/08 | Federal Ministry for the Environment | Department of Water Management; Team Leader (Legal) |
| **12** | BMU 2008b | 20/5/08 | Federal Ministry for the Environment | Department of Water Management; Scientific Officer |
| **13** | Deutsche Rück 2008 | 23/5/08 | Deutsche Rück | NatCat Center/ Underwriting |
| **14** | LAWA 2008a | 26/5/08 | Inter-Länder Working Group Water | Head of Flood Management Working Group |
| **15** | MUNLV 2008 | 27/5/08 | Ministry for the Environment in NRW | Department of Water Management, Supply, Drinking Water and Flood Management; Team Leader Flood Management |
| **16** | LAWA 2008b | 28/5/08 | Inter-Länder Working Group Water | LAWA-Headquarters (2008-2010); Chair |
| **17** | BMELV 2008 | 30/5/08 | Federal Ministry for Agriculture | Department of Water Management; Team Leader |
| **18** | BMVBS 2008 | 02/6/08 | Federal Ministry for Spatial Order, Urban Planning and Building | Department of Climate, Environment and Water; Scientific Officer |
| **19** | WWF 2008 | 12/6/08 | World Wildlife Fund for Nature Germany | NGO flood management expert |
| **20** | BUND 2008 | 12/6/08 | Association of the Environment and Conservation | NGO flood management expert |
| **21** | MunichRe 2009 | 31/3/09 | Munich Reinsurance | Head of Research Department (Hydrological Risk) |

| # | Reference | Date | Organisation | Position |
|---|---|---|---|---|
| **Germany (continued)** | | | | |
| **22** | BFG 2009 | 20/4/09 | Federal Institute of Hydrology | Vice-Director of Department Water Management, Predictions & Forecasts |
| **23** | Regional Water Authority Düsseldorf 2009 | 21/4/09 | Regional Water Authority Düsseldorf | Head of Water Management Department |
| **24** | Regional Planning Authority Düsseldorf 2009 | 21/4/09 | Regional Planning Authority Düsseldorf | Head of Planning Department |
| **25** | LANUV 2009 | 22/4/09 | Environment Agency of NR | Head of Flood and Water Quantity Management Department |
| **26** | MWME 2009 | 23/4/09 | Ministry of Economy, SMEs and Energy of NRW | Head of Department Spatial Planning |
| **27** | Planning Authority Dresden 2009 | 24/4/09 | Planning Authority Dresden | Head |
| **28** | Environment Agency Brandenburg 2009 | 12/8/09 | Environment Agency of Brandenburg | Department of Flood Management and Water Engineering; Scientific Officer |
| **29** | Allianz Insurance 2009 | 29/1/10 | Allianz Insurance | Department of Cat Management; Scientific Officer |
| **England** | | | | |
| **30** | Cabinet Office 2008 | 13/11/08 | Cabinet Office | Team leader Pitt Review |

| # | Reference | Date | Organisation | Position |
|---|---|---|---|---|
| **England (continued)** | | | | |
| **31** | DEFRA 2008 | 27/11/08 | Department for Environment, Food and Rural Affairs | Flood Management Unit; Project Manager Outcome Measures and Relations to ABI |
| **32** | ABI 2008 | 12/12/08 | Association of British Insurers | Policy advisor on climate chance and flooding |
| **33** | EA 2009a | 07/1/09 | Environment Agency (London Headquarters) | Flood Management Unit; Policy Advisor |
| **34** | EA 2009b | 07/1/09 | Environment Agency (London Headquarters) | Flood Management Unit; Team leader flood mapping |
| **35** | EA 2009c | 07/1/09 | Environment Agency (London Headquarters) | Flood Management Unit; Policy Manager Regulation |
| **36** | Aviva 2009 | 16/1/09 | Aviva Insurance (formerly Norwich Union) | Head of statistics and risk assessment |
| **37** | Aviva 2009 | 16/1/09 | Aviva Insurance (formerly Norwich Union) | Project Team Flood Map; Geoscience expert |
| **38** | IDB 2009 | 27/1/09 | Internal Drainage Board Linsey Marsh | Director IDB [and Operations Manager Association of Drainage Authorities] |
| **39** | MetOffice 2009 | 13/2/09 | MetOffice UK | Chief Advisor to Government |
| **40** | Sterling Insurance Group 2009 | 27/2/09 | Sterling Insurance Group | Department of Personal Insurance; Technical Manager |
| **41** | EA 2009d | 20/3/09 | Environment Agency Thames Region | Asset System Management; policy advisor |

| # | Reference | Date | Organisation | Position |
|---|---|---|---|---|
| **England (continued)** | | | | |
| **42** | HM Treasury | 30/6/09 | HM Treasury | DEFRA Spending, strategy and performance unit; Policy officer |
| **43** | NFF 2009 | 30/6/09 | National Flood Forum | Chairman |
| **44** | RFDC 2009 | 05/7/09 | Regional Flood Defence Committee Yorkshire, Environment Agency | Chair |
| **45** | Local Planner South Holland 2009 | 20/10/09 | South Holland District Council | Head of Planning and Development |
| **46** | DETR/DCLG 2009a | 21/7/09 | Department of the Environment, Transport and the Regions (1998-2001)/ Department of communities and local government (since 2006) | DCLG Head of Flooding, Coastal Erosion and Water Team |
| **47** | DETR/DCLG 2009b | 01/11/09 | Department of the Environment, Transport and the Regions (1998-2001)/ Department of communities and local government (since 2006) | DETR Planning Directorate; Policy lead for PPG25 |
| **EU** | | | | |
| **48** | European Commission 2009 | 28/5/09 | DG Environment | Unit Protection of Water and Marine Environment |